

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Date of last precipitation: Quantity:
Photograph Information:
Elevated Turbidity? (Y/N): Canopy (% open):
Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

57

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-116** RIVER BASIN **Sugar Creek** DRAINAGE AREA (mi²) **1.03**

LENGTH OF STREAM REACH (ft) **6,657** LAT. **41.17873** LONG. **-83.02263** RIVER CODE RIVER MILE

DATE **04/26/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="85%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**

TOTAL NUMBER OF SUBSTRATE TYPES: **3**

HHEI Metric Points

Substrate Max = 40

12

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS MAXIMUM POOL DEPTH (centimeters): **15**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **2.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS **Western portion has mature woods along banks. but majority does not.**

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Watson NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/20/17 Quantity: 0.21
Photograph Information: Representative Photos Taken
Elevated Turbidity? (Y/N): N Canopy (% open): 80%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Nearby road and crop areas

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

42**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-117** RIVER BASIN **Sugar Creek** DRAINAGE AREA (mi²) **0.27**

LENGTH OF STREAM REACH (ft) **2,199** LAT. **41.17611** LONG. **-83.01817** RIVER CODE RIVER MILE

DATE **04/26/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="85%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

9

TOTAL NUMBER OF SUBSTRATE TYPES:

3**HHEI Metric Points**

Substrate Max = 40

12

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS MAXIMUM POOL DEPTH (centimeters): **15**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.90**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

FLOODPLAIN QUALITY

| L | R | (Per Bank) | L | R | (Most Predominant per Bank) | L | R | |
|-------------------------------------|-------------------------------------|----------------|--------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m | <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland | <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m | <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field | <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m | <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None | <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture | <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

13

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-118** RIVER BASIN **Westerhouse ditch** DRAINAGE AREA (mi²) **0.00**

LENGTH OF STREAM REACH (ft) **834** LAT. **41.15957** LONG. **-82.99000** RIVER CODE RIVER MILE

DATE **04/27/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="95%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**

TOTAL NUMBER OF SUBSTRATE TYPES: **2**

HHEI Metric Points

Substrate Max = 40

8

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

0

COMMENTS MAXIMUM POOL DEPTH (centimeters): **0**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/27/17 Quantity: 0.07
Photograph Information: Representative Photos Taken
Elevated Turbidity? (Y/N): N Canopy (% open): 75%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Nearby road and crop areas

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

59

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-119** RIVER BASIN **Morrison Creek** DRAINAGE AREA (mi²) **0.31**

LENGTH OF STREAM REACH (ft) **661** LAT. **41.14766** LONG. **-82.98625** RIVER CODE RIVER MILE

DATE **04/27/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="70%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **5.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**

TOTAL NUMBER OF SUBSTRATE TYPES: **5**

HHEI Metric Points

Substrate Max = 40

14

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS MAXIMUM POOL DEPTH (centimeters): **15**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **2.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

55

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-120** RIVER BASIN **Morrison Creek** DRAINAGE AREA (mi²) **0.19**

LENGTH OF STREAM REACH (ft) **2,783** LAT. **41.14975** LONG. **-82.96973** RIVER CODE RIVER MILE

DATE **04/27/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---|---|---|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="checkbox"/> 0% | <input type="checkbox"/> SILT [3 pt] | <input checked="" type="checkbox"/> 20% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="checkbox"/> 0% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="checkbox"/> 5% |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="checkbox"/> 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="checkbox"/> 0% |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input checked="" type="checkbox"/> 15% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="checkbox"/> 0% |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input checked="" type="checkbox"/> 25% | <input type="checkbox"/> MUCK [0 pts] | <input type="checkbox"/> 0% |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input checked="" type="checkbox"/> 35% | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="checkbox"/> 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **15.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **15**

TOTAL NUMBER OF SUBSTRATE TYPES: **5**

HHEI Metric Points

Substrate Max = 40

20

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **10**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **2.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/27/17 Quantity: 0.07

Photograph Information: Representative Photos Taken

Elevated Turbidity? (Y/N): N Canopy (% open): 15%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:

Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)

Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Nearby road and crop areas

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

17

SITE NAME/LOCATION **Apex Republic Wind Farm**SITE NUMBER **DOH-121**RIVER BASIN **Morrison Creek**DRAINAGE AREA (mi²) **0.00**LENGTH OF STREAM REACH (ft) **543**LAT. **41.14660**LONG. **-82.96892**

RIVER CODE

RIVER MILE

DATE **04/27/17**SCORER **BJS**

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS:

☐ NONE / NATURAL CHANNEL☐ RECOVERED☐ RECOVERING☒ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

| | |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

BLDR SLABS [16 pts]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pts]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [9 pts]

SAND (<2 mm) [6 pts]

PERCENT

| |
|----------------------|
| <input type="text"/> |
| <input type="text"/> |
| <input type="text"/> |
| <input type="text"/> |
| <input type="text"/> |
| <input type="text"/> |
| <input type="text"/> |
| <input type="text"/> |

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

0.00%

(A)

TYPE

| | |
|-------------------------------------|--------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

SILT [3 pt]

LEAF PACK/WOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pt]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

| |
|----------------------|
| <input type="text"/> |
| <input type="text"/> |
| <input type="text"/> |
| <input type="text"/> |
| <input type="text"/> |
| <input type="text"/> |
| <input type="text"/> |
| <input type="text"/> |

Substrate Percentage
Check

100%

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

9

TOTAL NUMBER OF SUBSTRATE TYPES:

3

HHEI
Metric
PointsSubstrate
Max = 40

12

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

> 30 centimeters [20 pts]

> 22.5 - 30 cm [30 pts]

> 10 - 22.5 cm [25 pts]

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

> 5 cm - 10 cm [15 pts]

< 5 cm [5 pts]

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

Pool Depth
Max = 30

0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

> 4.0 meters (> 13') [30 pts]

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

> 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters):

0.70

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| | |
|-------------------------------------|-------------------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

(Per Bank)

Wide >10m

Moderate 5-10m

Narrow <5m

None

COMMENTS

FLOODPLAIN QUALITY

| | |
|--------------------------|--------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

(Most Predominant per Bank)

Mature Forest, Wetland

Immature Forest, Shrub or Old
Field

Residential, Park, New Field

Fenced Pasture

| | |
|-------------------------------------|-------------------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

Conservation Tillage

Urban or Industrial

Open Pasture, Row Crop

Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

Stream Flowing

Subsurface flow with isolated pools (Interstitial)

COMMENTS

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |

Moist Channel, isolated pools, no flow (Intermittent)

Dry channel, no water (Ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

None

0.5

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |

1.0

1.5

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |

2.0

2.5

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |

3.0

>3

STREAM GRADIENT ESTIMATE

☒

Flat (0.5 ft/100 ft)

☐

Flat to Moderate

☐

Moderate (2 ft/100 ft)

☐

Moderate to Severe

☐

Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/27/17 Quantity: 0.07

Photograph Information: Representative Photos Taken

Elevated Turbidity? (Y/N): N Canopy (% open): 100%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:

Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)

Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

Nearby road and crop areas

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

20

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-122** RIVER BASIN **Morrison Creek** DRAINAGE AREA (mi²) **0.00**

LENGTH OF STREAM REACH (ft) **410** LAT. **41.14650** LONG. **-82.96891** RIVER CODE RIVER MILE

DATE **04/27/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> SILT [3 pt] | <input type="text" value="40%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="50%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **95%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **12**

TOTAL NUMBER OF SUBSTRATE TYPES: **3**

HHEI Metric Points

Substrate Max = 40

15

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

0

COMMENTS MAXIMUM POOL DEPTH (centimeters): **0**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.70**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

58

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-123** RIVER BASIN **Morrison Creek** DRAINAGE AREA (mi²) **0.53**

LENGTH OF STREAM REACH (ft) **2,316** LAT. **41.13359** LONG. **-82.97269** RIVER CODE RIVER MILE

DATE **04/28/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="70%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="10%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="15%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**

TOTAL NUMBER OF SUBSTRATE TYPES: **4**

HHEI Metric Points

Substrate Max = 40

13

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS MAXIMUM POOL DEPTH (centimeters): **15**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **2.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS **Minor woodlot along reach, but majority abuts open row crop**

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|---|------------------------------|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input checked="" type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/28/17 Quantity: 0.44
Photograph Information: Representative Photos Taken
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Nearby road and crop areas

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

17

SITE NAME/LOCATION **Apex Republic Wind Farm**SITE NUMBER **DOH-124**RIVER BASIN **Morrison Creek**DRAINAGE AREA (mi²) **0.11**LENGTH OF STREAM REACH (ft) **164**LAT. **41.13351**LONG. **-82.97181**

RIVER CODE

RIVER MILE

DATE **04/28/17**SCORER **BJS**

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS:

☐ NONE / NATURAL CHANNEL☐ RECOVERED☐ RECOVERING☒ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

| | |
|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

BLDR SLABS [16 pts]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pts]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [9 pts]

SAND (<2 mm) [6 pts]

PERCENT

| |
|------------|
| 0% |
| 0% |
| 0% |
| 0% |
| 0% |
| 15% |

TYPE

| | |
|-------------------------------------|--------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

SILT [3 pt]

LEAF PACK/WOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pt]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

| |
|------------|
| 75% |
| 10% |
| 0% |
| 0% |
| 0% |
| 0% |
| 0% |
| 0% |

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock**0.00%**

(A)

Substrate Percentage
Check**100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

9

TOTAL NUMBER OF SUBSTRATE TYPES:

3HHEI
Metric
PointsSubstrate
Max = 40**12**

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

> 30 centimeters [20 pts]

☐ > 22.5 - 30 cm [30 pts]☐ > 10 - 22.5 cm [25 pts]

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

> 5 cm - 10 cm [15 pts]

☐ < 5 cm [5 pts]☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0Pool Depth
Max = 30**0**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

> 4.0 meters (> 13') [30 pts]

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

> 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters):

0.50Bankfull
Width
Max=30**5**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| | |
|-------------------------------------|-------------------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

(Per Bank)

Wide >10m

Moderate 5-10m

Narrow <5m

None

FLOODPLAIN QUALITY

| | |
|--------------------------|--------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

(Most Predominant per Bank)

Mature Forest, Wetland

Immature Forest, Shrub or Old Field

Residential, Park, New Field

Fenced Pasture

| | |
|-------------------------------------|-------------------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

Conservation Tillage

Urban or Industrial

Open Pasture, Row Crop

Mining or Construction

COMMENTS Minor woodlot along reach, but majority abuts open row cropFLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

Stream Flowing

Subsurface flow with isolated pools (Interstitial)

COMMENTS

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

Moist Channel, isolated pools, no flow (Intermittent)

Dry channel, no water (Ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

None

0.5

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |

1.0

1.5

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |

2.0

2.5

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |

3.0

>3

STREAM GRADIENT ESTIMATE

☒

Flat (0.5 ft/100 ft)

☐

Flat to Moderate

☐

Moderate (2 ft/100 ft)

☐

Moderate to Severe

☐

Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

18

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-125** RIVER BASIN **Morrison Creek** DRAINAGE AREA (mi²) **0.00**

LENGTH OF STREAM REACH (ft) **4,861** LAT. **41.13920** LONG. **-82.96031** RIVER CODE RIVER MILE

DATE **04/28/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="75%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="10%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**

TOTAL NUMBER OF SUBSTRATE TYPES: **4**

HHEI Metric Points

Substrate Max = 40

13

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

0

COMMENTS MAXIMUM POOL DEPTH (centimeters): **0**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

30

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-127** RIVER BASIN **Westerhouse Ditch** DRAINAGE AREA (mi²) **0.27**

LENGTH OF STREAM REACH (ft) **2,828** LAT. **41.13669** LONG. **-82.94918** RIVER CODE RIVER MILE

DATE **04/28/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|--|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="70%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="15%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**

TOTAL NUMBER OF SUBSTRATE TYPES: **4**

HHEI Metric Points

Substrate Max = 40

10

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **15**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: **Fireside** NRCS Soil Map Page: NRCS Soil Map Stream Order
County: **Seneca** Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: **04/28/17** Quantity: **0.44**Photograph Information: **Representative Photos Taken**Elevated Turbidity? (Y/N): ☒ N Canopy (% open): **100%**Were samples collected for water chemistry? (Y/N): ☒ N (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain: Additional comments/description of pollution impacts:
Nearby road and crop areas**BIOTIC EVALUATION**Performed? (Y/N): ☒ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Salamanders Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N
Frogs or Tadpoles Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Aquatic Macroinvertebrates Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ NComments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →





Primary Headwater Habitat Evaluation Form

54

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Apex Republic Wind Farm**SITE NUMBER **DOH-128**RIVER BASIN **Westerhouse Ditch**DRAINAGE AREA (mi²) **0.22**LENGTH OF STREAM REACH (ft) **1,468**LAT. **41.14172**LONG. **-82.95459**

RIVER CODE

RIVER MILE

DATE **04/28/17**SCORER **BJS**

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL
MODIFICATIONS:☐ NONE / NATURAL CHANNEL☐ RECOVERED☐ RECOVERING☒ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

| | |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

BLDR SLABS [16 pts]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pts]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [9 pts]

SAND (<2 mm) [6 pts]

PERCENT

| |
|-----------|
| 0% |
| 0% |
| 0% |
| 0% |
| 0% |
| 5% |

TYPE

| | |
|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

SILT [3 pt]

LEAF PACK/WOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pt]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

| |
|------------|
| 80% |
| 15% |
| 0% |
| 0% |
| 0% |
| 0% |

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock**0.00%**

(A)

Substrate Percentage
Check**100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

6

TOTAL NUMBER OF SUBSTRATE TYPES:

3HHEI
Metric
PointsSubstrate
Max = 40**9**

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

> 30 centimeters [20 pts]

☐ > 22.5 - 30 cm [30 pts]☐ > 10 - 22.5 cm [25 pts]

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

> 5 cm - 10 cm [15 pts]

☐ < 5 cm [5 pts]☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

15Pool Depth
Max = 30**25**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

> 4.0 meters (> 13') [30 pts]

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

> 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters):

2.20Bankfull
Width
Max=30**20**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| | |
|-------------------------------------|-------------------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

(Per Bank)

Wide >10m

Moderate 5-10m

Narrow <5m

None

COMMENTS

FLOODPLAIN QUALITY

| | |
|--------------------------|--------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

(Most Predominant per Bank)

Mature Forest, Wetland

Immature Forest, Shrub or Old Field

Residential, Park, New Field

Fenced Pasture

| | |
|-------------------------------------|-------------------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

Conservation Tillage

Urban or Industrial

Open Pasture, Row Crop

Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

Stream Flowing

Subsurface flow with isolated pools (Interstitial)

COMMENTS

| |
|-------------------------------------|
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

Moist Channel, isolated pools, no flow (Intermittent)

Dry channel, no water (Ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

None

0.5

| |
|-------------------------------------|
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

1.0

1.5

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

2.0

2.5

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

3.0

>3

STREAM GRADIENT ESTIMATE

☒

Flat (0.5 ft/100 ft)

☐

Flat to Moderate

☐

Moderate (2 ft/100 ft)

☐

Moderate to Severe

☐

Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: **Fireside** NRCS Soil Map Page: NRCS Soil Map Stream Order
County: **Seneca** Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): **Y** Date of last precipitation: **04/28/17** Quantity: **0.44**Photograph Information: **Representative Photos Taken**Elevated Turbidity? (Y/N): **N** Canopy (% open): **100%**Were samples collected for water chemistry? (Y/N): **N** (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) **Y** If not, please explain: Additional comments/description of pollution impacts:
Nearby road and crop areas**BIOTIC EVALUATION**Performed? (Y/N): **N** (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) **N** Voucher? (Y/N) **N** Salamanders Observed? (Y/N) **N** Voucher? (Y/N) **N**
Frogs or Tadpoles Observed? (Y/N) **N** Voucher? (Y/N) **N** Aquatic Macroinvertebrates Observed? (Y/N) **N** Voucher? (Y/N) **N**Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

13

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-150** RIVER BASIN **Westerhouse Ditch** DRAINAGE AREA (mi²) **0.13**

LENGTH OF STREAM REACH (ft) **285** LAT. **41.15727** LONG. **-82.99003** RIVER CODE RIVER MILE

DATE **04/27/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="95%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**

TOTAL NUMBER OF SUBSTRATE TYPES: **2**

HHEI Metric Points

Substrate Max = 40

8

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

0

COMMENTS MAXIMUM POOL DEPTH (centimeters): **0**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

17

HHEI Score (sum of metrics 1, 2, 3) :

| | | | | | | |
|-----------------------------|-------------------------|-------------|--------------|----------------------------------|-----------|------------|
| SITE NAME/LOCATION | Apex Republic Wind Farm | | | | | |
| SITE NUMBER | DOH-152 | RIVER BASIN | Beaver Creek | DRAINAGE AREA (mi ²) | 0.20 | |
| LENGTH OF STREAM REACH (ft) | 1,924 | LAT. | 41.17188 | LONG. | -82.89739 | RIVER CODE |
| DATE | 10/17/17 | SCORER | MAM | COMMENTS | | |

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------|---|---------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | 0% | <input checked="" type="checkbox"/> SILT [3 pt] | 85% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | 0% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | 0% |
| <input type="checkbox"/> BEDROCK [16 pt] | 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | 0% |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | 0% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | 5% |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | 0% | <input type="checkbox"/> MUCK [0 pts] | 0% |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | 10% | <input type="checkbox"/> ARTIFICIAL [3 pts] | 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0.00%

(A)

Substrate Percentage Check 100%

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 9

TOTAL NUMBER OF SUBSTRATE TYPES: 3

HHEI Metric Points

Substrate Max = 40

12

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

0

COMMENTS Only water by culvert/tile discharge

MAXIMUM POOL DEPTH (centimeters): 0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): 1.00

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS Sits within active field

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

| | | | | |
|--|---|---|---|--|
| <input checked="" type="checkbox"/> Flat (0.5 ft/100 ft) | <input type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|--|---|---|---|--|

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: 10/12/17 Quantity: 0.02
Photograph Information: 3 photos taken
Elevated Turbidity? (Y/N): ☒ N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): ☒ N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): ☒ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Salamanders Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N
Frogs or Tadpoles Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Aquatic Macroinvertebrates Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

61**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-153** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **3.22**

LENGTH OF STREAM REACH (ft) **2,284** LAT. **41.16722** LONG. **-82.89357** RIVER CODE RIVER MILE

DATE **10/17/17** SCORER **MAM** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="95%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

9

TOTAL NUMBER OF SUBSTRATE TYPES:

2**HHEI Metric Points**

Substrate Max = 40

11

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS **Several tile discharges**

MAXIMUM POOL DEPTH (centimeters):

20

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

25

COMMENTS AVERAGE BANKFULL WIDTH (meters):

4.00

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

| RIPARIAN WIDTH | | FLOODPLAIN QUALITY | |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| L | R | L | R |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| (Per Bank) | | (Most Predominant per Bank) | |
| Wide >10m | | Mature Forest, Wetland | <input type="checkbox"/> |
| Moderate 5-10m | | Immature Forest, Shrub or Old Field | <input type="checkbox"/> |
| Narrow <5m | | Residential, Park, New Field | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Fenced Pasture | <input type="checkbox"/> |
| None | | | <input type="checkbox"/> |

COMMENTS **At Flag 23. transitions into forested modified ditch with more rocks, cobble, etc**

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: 10/12/17 Quantity: 0.02
Photograph Information: 8 photos taken
Elevated Turbidity? (Y/N): ☐ N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): ☐ N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): ☐ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Salamanders Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N
Frogs or Tadpoles Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Aquatic Macroinvertebrates Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

18

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-156** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.11**

LENGTH OF STREAM REACH (ft) **961** LAT. **41.16737** LONG. **-82.87626** RIVER CODE RIVER MILE

DATE **10/17/17** SCORER **MAM** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|--|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="80%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="20%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**

TOTAL NUMBER OF SUBSTRATE TYPES: **2**

HHEI Metric Points

Substrate Max = 40

8

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input checked="" type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

5

COMMENTS MAXIMUM POOL DEPTH (centimeters): **5**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.90**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS **Excavated material appears to be built up alongside**

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|---|------------------------------|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input checked="" type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: 10/12/17 Quantity: 0.02
Photograph Information: 2 photos
Elevated Turbidity? (Y/N): ☐ N Canopy (% open): 30%
Were samples collected for water chemistry? (Y/N): ☐ N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): ☐ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Salamanders Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N
Frogs or Tadpoles Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Aquatic Macroinvertebrates Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

38**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-159** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.47**

LENGTH OF STREAM REACH (ft) **2,442** LAT. **41.18466** LONG. **-82.87483** RIVER CODE RIVER MILE

DATE **10/17/17** SCORER **MAM** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|---|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="85%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **10.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

15

TOTAL NUMBER OF SUBSTRATE TYPES:

3**HHEI Metric Points**

Substrate Max = 40

18

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS **Standing water throughout**

MAXIMUM POOL DEPTH (centimeters):

10

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS **AVERAGE BANKFULL WIDTH (meters):** **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS **Modified ditch, runs along forest edge**

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|---|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input checked="" type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

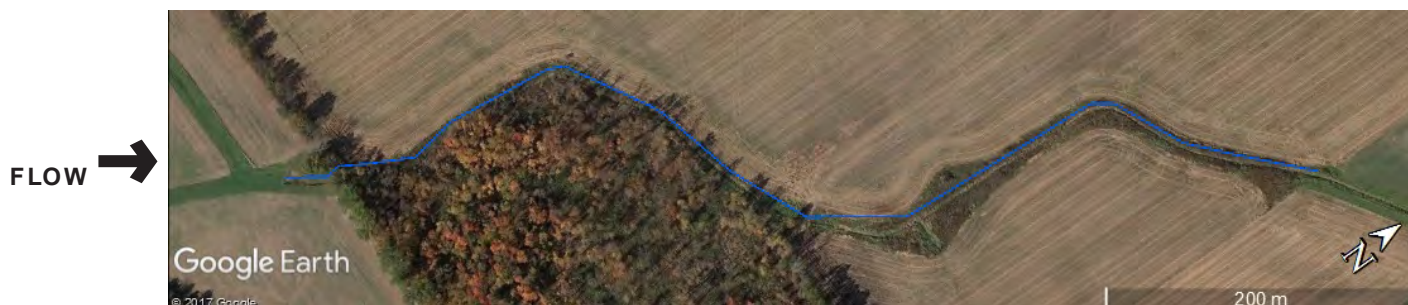
☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): ☐ Y Date of last precipitation: 10/12/17 Quantity: 0.02
Photograph Information: 2 photos
Elevated Turbidity? (Y/N): ☐ N Canopy (% open): 90%
Were samples collected for water chemistry? (Y/N): ☐ N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) ☐ Y If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): ☐ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Salamanders Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N
Frogs or Tadpoles Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Aquatic Macroinvertebrates Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

44

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Apex Republic Wind Farm**SITE NUMBER **DOH-160**RIVER BASIN **Beaver Creek**DRAINAGE AREA (mi²) **0.07**LENGTH OF STREAM REACH (ft) **1,314**LAT. **41.18396**LONG. **-82.88652**

RIVER CODE

RIVER MILE

DATE **10/17/17**SCORER **MAM**

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS:

☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|---|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="40%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="10%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="30%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="20%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **30.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **15**TOTAL NUMBER OF SUBSTRATE TYPES: **4**

HHEI Metric Points

Substrate Max = 40

19

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input checked="" type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

5

COMMENTS

MAXIMUM POOL DEPTH (centimeters): **2**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS

AVERAGE BANKFULL WIDTH (meters): **1.70**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

FLOODPLAIN QUALITY

| L | R | (Per Bank) | L | R | (Most Predominant per Bank) | L | R | |
|-------------------------------------|-------------------------------------|----------------|--------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m | <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland | <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Moderate 5-10m | <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field | <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m | <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | None | <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture | <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: 10/12/17 Quantity: 0.02
Photograph Information: 2 photos
Elevated Turbidity? (Y/N): ☐ N Canopy (% open): 0%
Were samples collected for water chemistry? (Y/N): ☐ N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): ☐ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Salamanders Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N
Frogs or Tadpoles Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Aquatic Macroinvertebrates Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →





Primary Headwater Habitat Evaluation Form

32**HHEI Score (sum of metrics 1, 2, 3) :**SITE NAME/LOCATION **Apex Republic Wind Farm**SITE NUMBER **DOH-161**RIVER BASIN **Beaver Creek**DRAINAGE AREA (mi²) **6.44**LENGTH OF STREAM REACH (ft) **617**LAT. **41.19086**LONG. **-82.89464**

RIVER CODE

RIVER MILE

DATE **10/18/01**SCORER **MAM**

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions**STREAM CHANNEL MODIFICATIONS:**☐ NONE / NATURAL CHANNEL☐ RECOVERED☒ RECOVERING☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="75%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="20%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**TOTAL NUMBER OF SUBSTRATE TYPES: **3****HHEI Metric Points**

Substrate Max = 40

12

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input checked="" type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

5

COMMENTS

MAXIMUM POOL DEPTH (centimeters): **3**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS

AVERAGE BANKFULL WIDTH (meters): **1.20****This information must also be completed****RIPARIAN ZONE AND FLOODPLAIN QUALITY**

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH**FLOODPLAIN QUALITY**

| L | R | (Per Bank) | L | R | (Most Predominant per Bank) | L | R | |
|-------------------------------------|-------------------------------------|----------------|--------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m | <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland | <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m | <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field | <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m | <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | None | <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture | <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: 10/12/17 Quantity: 0.02
Photograph Information: 3 photos
Elevated Turbidity? (Y/N): ☐ N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): ☐ N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): ☐ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Salamanders Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N
Frogs or Tadpoles Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Aquatic Macroinvertebrates Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

32

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Apex Republic Wind Farm**SITE NUMBER **DOH-165**RIVER BASIN **Morrison Creek**DRAINAGE AREA (mi²) **0.31**LENGTH OF STREAM REACH (ft) **1,468**LAT. **41.14419**LONG. **-82.98379**

RIVER CODE

RIVER MILE

DATE **10/18/17**SCORER **MAM**

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL
MODIFICATIONS:☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="80%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="15%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage
Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**TOTAL NUMBER OF SUBSTRATE TYPES: **3**HHEI
Metric
PointsSubstrate
Max = 40**12**

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth
Max = 30**15**

COMMENTS

MAXIMUM POOL DEPTH (centimeters): **10**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull
Width
Max=30**5**

COMMENTS

AVERAGE BANKFULL WIDTH (meters): **0.90**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: 10/12/17 Quantity: 0.02
Photograph Information: 5 photos
Elevated Turbidity? (Y/N): ☐ N Canopy (% open): 85%
Were samples collected for water chemistry? (Y/N): ☐ N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain:

Additional comments/description of pollution impacts:

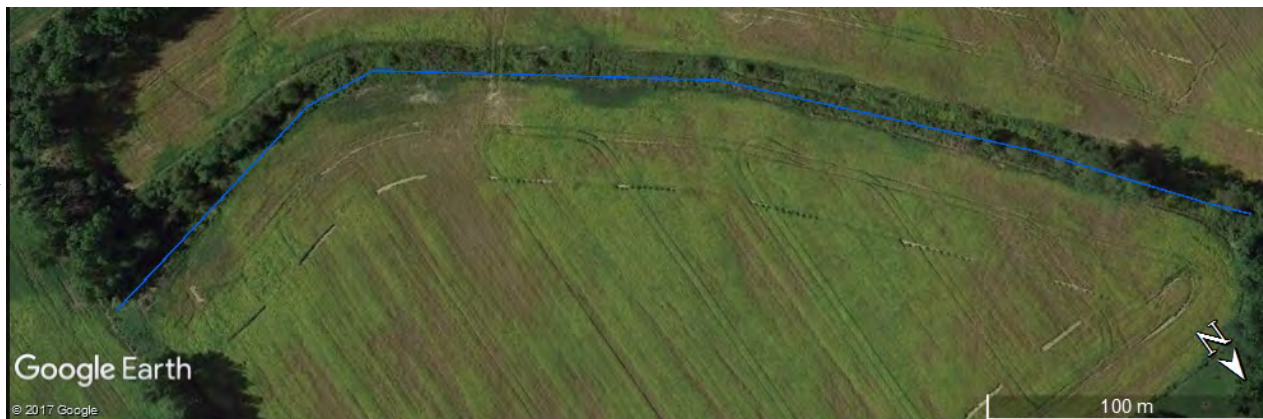
BIOTIC EVALUATION

Performed? (Y/N): ☐ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Salamanders Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N
Frogs or Tadpoles Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N Aquatic Macroinvertebrates Observed? (Y/N) ☐ N Voucher? (Y/N) ☐ N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →





Primary Headwater Habitat Evaluation Form

52**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-166** RIVER BASIN **Morrion Creek** DRAINAGE AREA (mi²) **0.15**

LENGTH OF STREAM REACH (ft) **1,563** LAT. **41.14419** LONG. **-82.98379** RIVER CODE RIVER MILE

DATE **10/18/17** SCORER **MAM** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|---|-----------|---|------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | 0% | <input checked="" type="checkbox"/> SILT [3 pt] | 95% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | 0% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | 0% |
| <input type="checkbox"/> BEDROCK [16 pt] | 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | 0% |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | 5% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | 0% |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | 0% | <input type="checkbox"/> MUCK [0 pts] | 0% |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | 0% | <input type="checkbox"/> ARTIFICIAL [3 pts] | 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **5.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 15

TOTAL NUMBER OF SUBSTRATE TYPES: 2

HHEI Metric Points

Substrate Max = 40

17**A + B**

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **8**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **2.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|---|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input checked="" type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

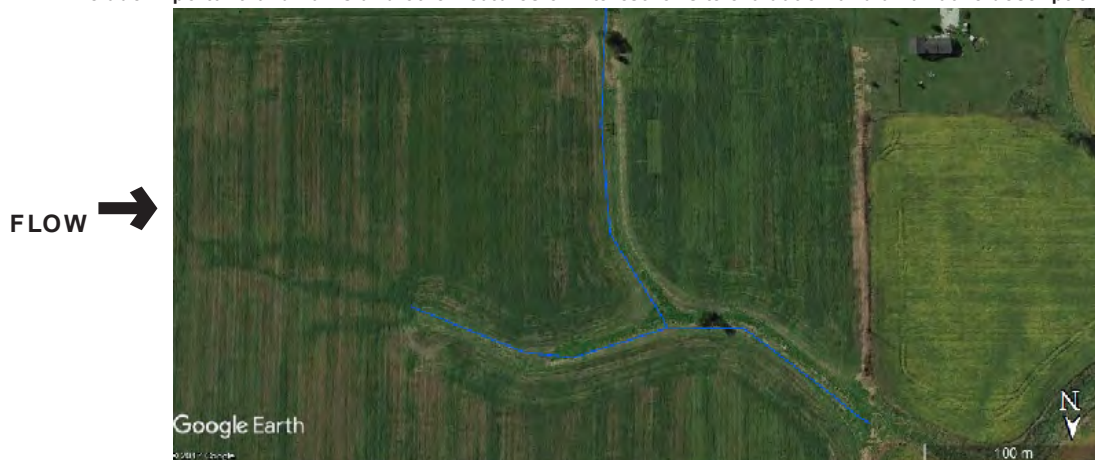
☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: 10/12/17 Quantity: 0.02
Photograph Information: 8 photos
Elevated Turbidity? (Y/N): ☒ N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): ☒ N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): ☒ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Salamanders Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N
Frogs or Tadpoles Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Aquatic Macroinvertebrates Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

35

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-168** RIVER BASIN **Westerhouse Ditch** DRAINAGE AREA (mi²) **1.48**

LENGTH OF STREAM REACH (ft) **2,679** LAT. **41.14367** LONG. **-82.93291** RIVER CODE RIVER MILE

DATE **10/19/17** SCORER **MAM** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="90%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **12**

TOTAL NUMBER OF SUBSTRATE TYPES: **3**

HHEI Metric Points

Substrate Max = 40

15

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input checked="" type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

5

COMMENTS MAXIMUM POOL DEPTH (centimeters): **5**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.30**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

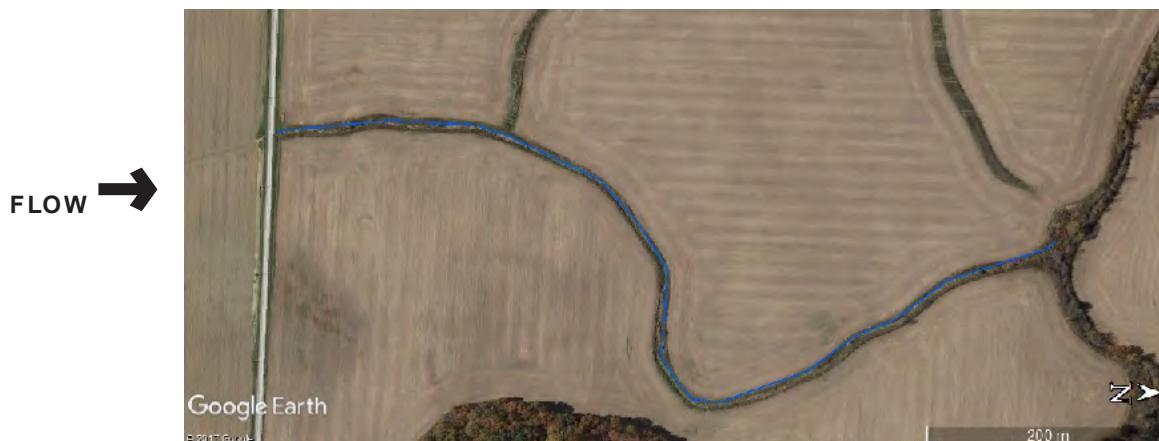
☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity:
Photograph Information:
Elevated Turbidity? (Y/N): Canopy (% open):
Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

19

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-169** RIVER BASIN **Morrison Creek** DRAINAGE AREA (mi²) **0.00**

LENGTH OF STREAM REACH (ft) **400** LAT. **41.13997** LONG. **-82.93835** RIVER CODE RIVER MILE

DATE **10/19/17** SCORER **MAM** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="95%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **12**TOTAL NUMBER OF SUBSTRATE TYPES: **2**

HHEI Metric Points

Substrate Max = 40

14

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

0

COMMENTS MAXIMUM POOL DEPTH (centimeters): **0**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.30**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity:
Photograph Information:
Elevated Turbidity? (Y/N): Canopy (% open):
Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

16

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-171** RIVER BASIN **Morrison Creek** DRAINAGE AREA (mi²) **0.00**

LENGTH OF STREAM REACH (ft) **507** LAT. **41.15547** LONG. **-82.95198** RIVER CODE RIVER MILE

DATE **10/19/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="75%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="20%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**

TOTAL NUMBER OF SUBSTRATE TYPES: **2**

HHEI Metric Points

Substrate Max = 40

11

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

0

COMMENTS MAXIMUM POOL DEPTH (centimeters): **0**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.90**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/12/17 Quantity: 0.02
Photograph Information: 2 photos
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

47

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-204** RIVER BASIN **Pickereel Creek** DRAINAGE AREA (mi²) **0.13**

LENGTH OF STREAM REACH (ft) **135** LAT. **41.26050** LONG. **-82.90881** RIVER CODE RIVER MILE

DATE **04/08/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|-----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="100%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**

TOTAL NUMBER OF SUBSTRATE TYPES: **1**

HHEI Metric Points

Substrate Max = 40

7

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS MAXIMUM POOL DEPTH (centimeters): **11**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.10**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|--------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: **Sandusky** Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: **04/05/17** Quantity: **0.54**
Photograph Information: **Representative overview photos taken**
Elevated Turbidity? (Y/N): ☒ N Canopy (% open): **100%**
Were samples collected for water chemistry? (Y/N): ☒ N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): ☒ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Salamanders Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N
Frogs or Tadpoles Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Aquatic Macroinvertebrates Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

37**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-205** RIVER BASIN **Pickereel Creek** DRAINAGE AREA (mi²) **0.00**

LENGTH OF STREAM REACH (ft) **1,323** LAT. **41.26173** LONG. **-82.90771** RIVER CODE RIVER MILE

DATE **04/08/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|-----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="100%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

6

TOTAL NUMBER OF SUBSTRATE TYPES:

1**HHEI Metric Points**

Substrate Max = 40

7**A + B**

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **8**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|---|--|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.10**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

FLOODPLAIN QUALITY

| L | R | (Per Bank) | L | R | (Most Predominant per Bank) | L | R | |
|-------------------------------------|-------------------------------------|----------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Mature Forest, Wetland | <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m | <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field | <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m | <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | None | <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture | <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

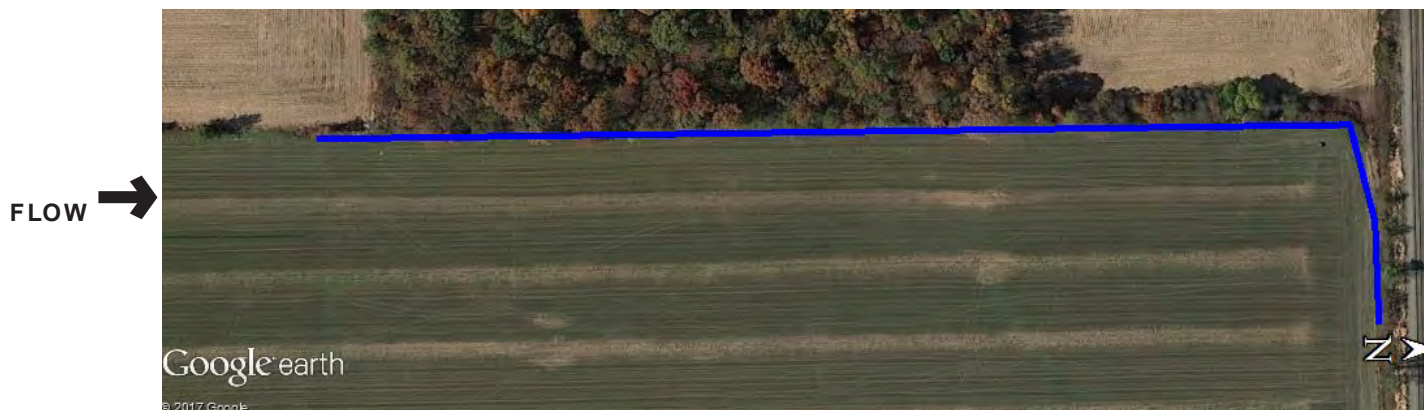
☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: **Sandusky** Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: **04/05/17** Quantity: **0.54**Photograph Information: **Representative overview photos taken**Elevated Turbidity? (Y/N): ☒ N Canopy (% open): **100%**Were samples collected for water chemistry? (Y/N): ☒ N (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): ☒ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Salamanders Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N
Frogs or Tadpoles Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Aquatic Macroinvertebrates Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ NComments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

52**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-206** RIVER BASIN **Pickereel Creek** DRAINAGE AREA (mi²) **0.36**

LENGTH OF STREAM REACH (ft) **454** LAT. **41.23284** LONG. **-82.84572** RIVER CODE RIVER MILE

DATE **04/08/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|-----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="100%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

6

TOTAL NUMBER OF SUBSTRATE TYPES:

1**HHEI Metric Points**

Substrate Max = 40

7**A + B**

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS MAXIMUM POOL DEPTH (centimeters): **15**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **2.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Date of last precipitation: Quantity:
Photograph Information:
Elevated Turbidity? (Y/N): Canopy (% open):
Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

42

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-207** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.69**

LENGTH OF STREAM REACH (ft) **1,936** LAT. **41.20514** LONG. **-82.91716** RIVER CODE RIVER MILE

DATE **04/08/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="80%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="15%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**TOTAL NUMBER OF SUBSTRATE TYPES: **3**

HHEI Metric Points

Substrate Max = 40

12

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS MAXIMUM POOL DEPTH (centimeters): **15**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

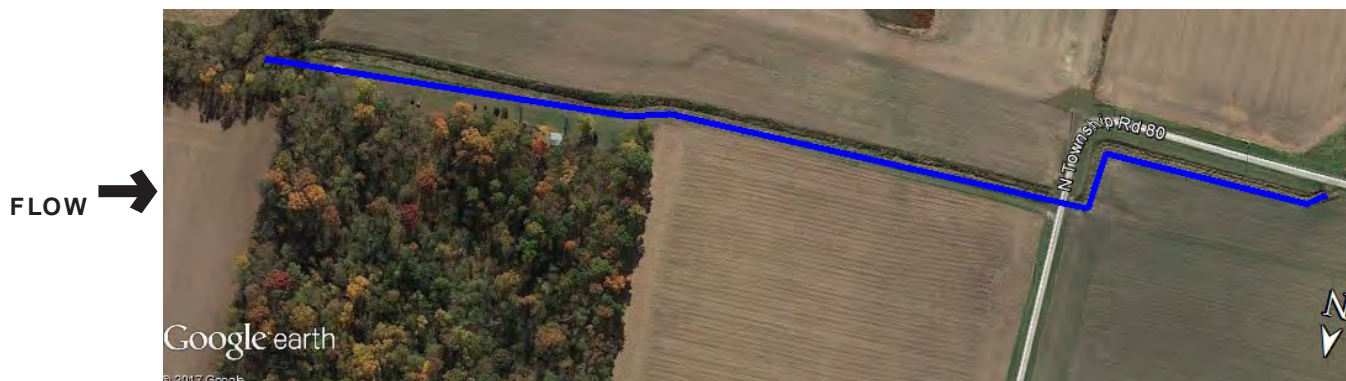
| | | | | |
|--|---|---|---|--|
| <input checked="" type="checkbox"/> Flat (0.5 ft/100 ft) | <input type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|--|---|---|---|--|

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

40**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-208** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.42**

LENGTH OF STREAM REACH (ft) **281** LAT. **41.20296** LONG. **-82.91395** RIVER CODE RIVER MILE

DATE **04/12/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="80%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="15%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12

TOTAL NUMBER OF SUBSTRATE TYPES: 3

HHEI Metric Points

Substrate Max = 40

15

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

20

COMMENTS MAXIMUM POOL DEPTH (centimeters): **40**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Senca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/11/17 Quantity: 0.05
Photograph Information: Representative overview photos taken
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

56**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-209** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.26**

LENGTH OF STREAM REACH (ft) **1,744** LAT. **41.20275** LONG. **-82.89723** RIVER CODE RIVER MILE

DATE **04/12/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|---|---|---|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="checkbox"/> 0% | <input type="checkbox"/> SILT [3 pt] | <input checked="" type="checkbox"/> 15% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input checked="" type="checkbox"/> 5% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="checkbox"/> 0% |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="checkbox"/> 5% | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="checkbox"/> 0% |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input checked="" type="checkbox"/> 20% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="checkbox"/> 0% |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input checked="" type="checkbox"/> 30% | <input type="checkbox"/> MUCK [0 pts] | <input type="checkbox"/> 0% |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input checked="" type="checkbox"/> 25% | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="checkbox"/> 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **30.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 15

TOTAL NUMBER OF SUBSTRATE TYPES: 6

HHEI Metric Points

Substrate Max = 40

21

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **7**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **2.80**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Senca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/11/17 Quantity: 0.05
Photograph Information: Representative overview photos taken
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

18

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-210** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.17**

LENGTH OF STREAM REACH (ft) **1,573** LAT. **41.18850** LONG. **-82.90719** RIVER CODE RIVER MILE

DATE **04/12/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|--|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="80%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="20%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**

TOTAL NUMBER OF SUBSTRATE TYPES: **2**

HHEI Metric Points

Substrate Max = 40

8

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input checked="" type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

5

COMMENTS MAXIMUM POOL DEPTH (centimeters): **5**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: **Fireside** NRCS Soil Map Page: NRCS Soil Map Stream Order
County: **Seneca** Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: **04/11/17** Quantity: **0.05**Photograph Information: **Representative overview photos taken**Elevated Turbidity? (Y/N): ☒ N Canopy (% open): **100%**Were samples collected for water chemistry? (Y/N): ☒ N (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): ☒ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Salamanders Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N
Frogs or Tadpoles Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Aquatic Macroinvertebrates Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ NComments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

47

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Apex Republic Wind Farm**SITE NUMBER **DOH-211**RIVER BASIN **Beaver Creek**DRAINAGE AREA (mi²) **0.24**LENGTH OF STREAM REACH (ft) **2,791**LAT. **41.18480**LONG. **-82.93550**

RIVER CODE

RIVER MILE

DATE **04/12/17**SCORER **BH**

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL
MODIFICATIONS:☐ NONE / NATURAL CHANNEL☐ RECOVERED☒ RECOVERING☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

| | |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

BLDR SLABS [16 pts]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pt]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [9 pts]

SAND (<2 mm) [6 pts]

PERCENT

| |
|-----------|
| 0% |
| 0% |
| 0% |
| 0% |
| 0% |
| 0% |
| 0% |

TYPE

| | |
|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

SILT [3 pt]

LEAF PACK/WOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pt]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

| |
|-------------|
| 100% |
| 0% |
| 0% |
| 0% |
| 0% |
| 0% |
| 0% |

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock**0.00%**

(A)

Substrate Percentage
Check**100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

6

TOTAL NUMBER OF SUBSTRATE TYPES:

1HHEI
Metric
PointsSubstrate
Max = 40**7**

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

> 30 centimeters [20 pts]

☐ > 22.5 - 30 cm [30 pts]☐ > 10 - 22.5 cm [25 pts]

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

> 5 cm - 10 cm [15 pts]

☐ < 5 cm [5 pts]☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

14Pool Depth
Max = 30**25**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

> 4.0 meters (> 13') [30 pts]

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

> 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]

| |
|-------------------------------------|
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters):

1.20Bankfull
Width
Max=30**15**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| | |
|-------------------------------------|-------------------------------------|
| L | R |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

(Per Bank)

Wide >10m

Moderate 5-10m

Narrow <5m

None

FLOODPLAIN QUALITY

| | |
|-------------------------------------|-------------------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

(Most Predominant per Bank)

Mature Forest, Wetland

Immature Forest, Shrub or Old
Field

Residential, Park, New Field

Fenced Pasture

| | |
|--------------------------|--------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

Conservation Tillage

Urban or Industrial

Open Pasture, Row Crop

Mining or Construction

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

Stream Flowing

Subsurface flow with isolated pools (Interstitial)

COMMENTS

| |
|-------------------------------------|
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

Moist Channel, isolated pools, no flow (Intermittent)

Dry channel, no water (Ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

None

0.5

| |
|-------------------------------------|
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

1.0

1.5

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

2.0

2.5

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

3.0

>3

STREAM GRADIENT ESTIMATE

☒

Flat (0.5 ft/100 ft)

☐

Flat to Moderate

☐

Moderate (2 ft/100 ft)

☐

Moderate to Severe

☐

Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Senca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/11/17 Quantity: 0.05
Photograph Information: Representative overview photos taken
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

37

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-212** RIVER BASIN **Westerhouse Ditch** DRAINAGE AREA (mi²) **0.14**

LENGTH OF STREAM REACH (ft) **1,148** LAT. **41.19424** LONG. **-82.97120** RIVER CODE RIVER MILE

DATE **04/25/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|-----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="100%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**

TOTAL NUMBER OF SUBSTRATE TYPES: **1**

HHEI Metric Points

Substrate Max = 40

7

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **7**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

| | |
|---|--|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.20**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

27

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-213** RIVER BASIN **Westerhouse Ditch** DRAINAGE AREA (mi²) **0.01**

LENGTH OF STREAM REACH (ft) **1,065** LAT. **41.19213** LONG. **-82.96490** RIVER CODE RIVER MILE

DATE **04/25/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|-----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="100%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**

TOTAL NUMBER OF SUBSTRATE TYPES: **1**

HHEI Metric Points

Substrate Max = 40

7

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

| | |
|--|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input checked="" type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

5

COMMENTS MAXIMUM POOL DEPTH (centimeters): **5**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

| | |
|---|--|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.20**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Senca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/20/17 Quantity: 0.21
Photograph Information: Representative overview photos taken
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →





Primary Headwater Habitat Evaluation Form

24

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-214** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.12**

LENGTH OF STREAM REACH (ft) **1,211** LAT. **41.17307** LONG. **-82.92563** RIVER CODE RIVER MILE

DATE **04/27/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="90%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **12**TOTAL NUMBER OF SUBSTRATE TYPES: **2**

HHEI Metric Points

Substrate Max = 40

14

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input checked="" type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

5

COMMENTS MAXIMUM POOL DEPTH (centimeters): **5**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Senca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/27/17 Quantity: 0.07
Photograph Information: Representative overview photos taken
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

28

HHEI Score (sum of metrics 1, 2, 3) :

| | | | | | |
|-----------------------------|-------------------------|-------------|--------------|----------------------------------|-----------|
| SITE NAME/LOCATION | Apex Republic Wind Farm | | | | |
| SITE NUMBER | DOH-215 | RIVER BASIN | Beaver Creek | DRAINAGE AREA (mi ²) | 0.00 |
| LENGTH OF STREAM REACH (ft) | 60 | LAT. | 41.15982 | LONG. | -82.92374 |
| DATE | 05/10/17 | RIVER CODE | | RIVER MILE | |
| SCORER | BH | COMMENTS | | | |

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------|--|---------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | 0% | <input checked="" type="checkbox"/> SILT [3 pt] | 75% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | 0% | <input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | 25% |
| <input type="checkbox"/> BEDROCK [16 pt] | 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | 0% |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | 0% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | 0% |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | 0% | <input type="checkbox"/> MUCK [0 pts] | 0% |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | 0% | <input type="checkbox"/> ARTIFICIAL [3 pts] | 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0.00%

(A)

Substrate Percentage Check 100%

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6

TOTAL NUMBER OF SUBSTRATE TYPES: 2

HHEI Metric Points

Substrate Max = 40

8

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input checked="" type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

5

COMMENTS: MAXIMUM POOL DEPTH (centimeters): 3

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS: AVERAGE BANKFULL WIDTH (meters): 1.50

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS:

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS:

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

| | | | | |
|--|---|---|---|--|
| <input checked="" type="checkbox"/> Flat (0.5 ft/100 ft) | <input type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|--|---|---|---|--|

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

57

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-216** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.15**

LENGTH OF STREAM REACH (ft) **394** LAT. **41.15418** LONG. **-82.92425** RIVER CODE RIVER MILE

DATE **05/10/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|-----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="100%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**TOTAL NUMBER OF SUBSTRATE TYPES: **1**

HHEI Metric Points

Substrate Max = 40

7

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

30

COMMENTS MAXIMUM POOL DEPTH (centimeters): **25**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **3.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Senca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 05/05/17 Quantity: 0.99
Photograph Information: Representative overview photos taken
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

37**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-217** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.01**

LENGTH OF STREAM REACH (ft) **1,440** LAT. **41.15789** LONG. **-82.92566** RIVER CODE RIVER MILE

DATE **05/10/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|-----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="100%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

6

TOTAL NUMBER OF SUBSTRATE TYPES:

1**HHEI Metric Points**

Substrate Max = 40

7**A + B**

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS MAXIMUM POOL DEPTH (centimeters): **15**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☒ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Senca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 05/05/17 Quantity: 0.99
Photograph Information: Representative overview photos taken
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

47

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-218** RIVER BASIN **Westerhouse Ditch** DRAINAGE AREA (mi²) **0.07**

LENGTH OF STREAM REACH (ft) **951** LAT. **41.15446** LONG. **-82.93611** RIVER CODE RIVER MILE

DATE **05/10/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|--|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="50%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="30%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="15%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **3**

TOTAL NUMBER OF SUBSTRATE TYPES: **4**

HHEI Metric Points

Substrate Max = 40

7

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

20

COMMENTS MAXIMUM POOL DEPTH (centimeters): **50**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **2.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Senca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 05/05/17 Quantity: 0.99
Photograph Information: Representative overview photos taken
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

47

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-219** RIVER BASIN **Westerhouse Ditch** DRAINAGE AREA (mi²) **2.47**

LENGTH OF STREAM REACH (ft) **2,019** LAT. **41.14825** LONG. **-82.94136** RIVER CODE RIVER MILE

DATE **05/11/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|-----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="100%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**TOTAL NUMBER OF SUBSTRATE TYPES: **1**

HHEI Metric Points

Substrate Max = 40

7

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

20

COMMENTS MAXIMUM POOL DEPTH (centimeters): **40**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **3.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Senca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 05/11/17 Quantity: 0.75
Photograph Information: Representative overview photos taken
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

57

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **DOH-220** RIVER BASIN **Westerhouse Ditch** DRAINAGE AREA (mi²) **0.79**

LENGTH OF STREAM REACH (ft) **960** LAT. **41.14807** LONG. **-82.93937** RIVER CODE RIVER MILE

DATE **05/11/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|-----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="100%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**

TOTAL NUMBER OF SUBSTRATE TYPES: **1**

HHEI Metric Points

Substrate Max = 40

7

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

30

COMMENTS MAXIMUM POOL DEPTH (centimeters): **30**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **2.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

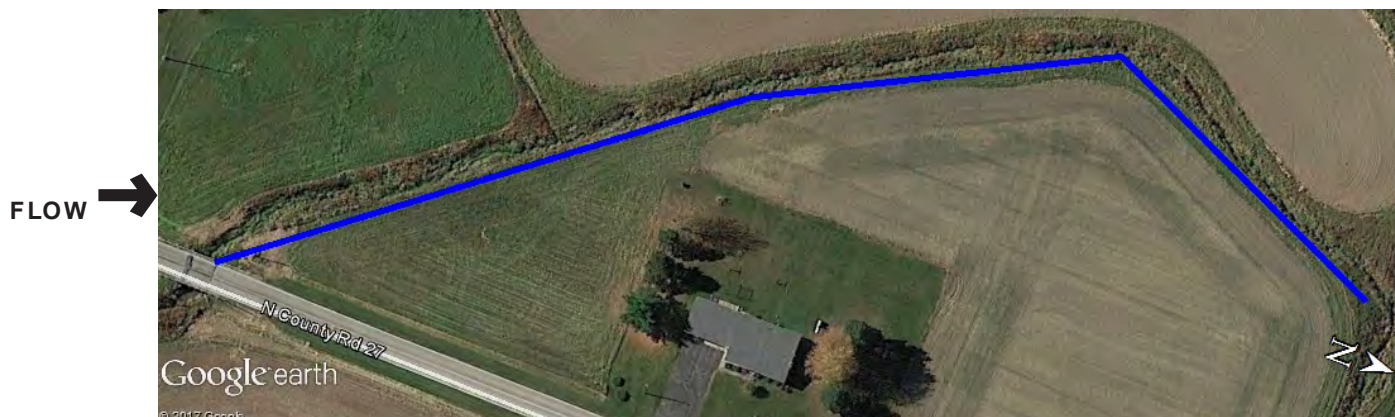
☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☒ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Senca Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 05/11/17 Quantity: 0.75Photograph Information: Representative overview photos takenElevated Turbidity? (Y/N): N Canopy (% open): 100%Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) Y If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) NComments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

33

HHEI Score (sum of metrics 1, 2, 3) :

| | | | | | |
|-----------------------------|-------------------------|-------------|--------------|----------------------------------|-----------|
| SITE NAME/LOCATION | Apex Republic Wind Farm | | | | |
| SITE NUMBER | SOH-001 | RIVER BASIN | Spicer Creek | DRAINAGE AREA (mi ²) | 0.04 |
| LENGTH OF STREAM REACH (ft) | 1,486 | LAT. | 41.21175 | LONG. | -83.12513 |
| DATE | 09/28/16 | RIVER CODE | | RIVER MILE | |
| SCORER | BJS | COMMENTS | | | |

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------|---|---------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | 0% | <input checked="" type="checkbox"/> SILT [3 pt] | 60% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | 0% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | 0% |
| <input type="checkbox"/> BEDROCK [16 pt] | 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | 0% |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | 5% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | 0% |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | 5% | <input type="checkbox"/> MUCK [0 pts] | 0% |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | 30% | <input type="checkbox"/> ARTIFICIAL [3 pts] | 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 5.00%

(A)

Substrate Percentage Check 100%

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 9

TOTAL NUMBER OF SUBSTRATE TYPES: 4

HHEI Metric Points

Substrate Max = 40

13

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS: Isolated pools, deepest at tile discharge point.

MAXIMUM POOL DEPTH (centimeters): 6

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS: AVERAGE BANKFULL WIDTH (meters): 0.90

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS: Wooded buffer tapers moving south: ends at field tile discharge/crop area

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS:

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|------------------------------|---|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input checked="" type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

| | | | | |
|---|--|---|---|--|
| <input type="checkbox"/> Flat (0.5 ft/100 ft) | <input checked="" type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|---|--|---|---|--|

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Tiffin North NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 09/26/16 Quantity: 0.43
Photograph Information: 3 Photos taken, 1 upstream, 1 downstream, and 1 looking field tile discharge location
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Located near active crop areas, receives flow from field tile.

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

74

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-002** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **48.76**

LENGTH OF STREAM REACH (ft) **740** LAT. **41.22812** LONG. **-83.05467** RIVER CODE RIVER MILE

DATE **09/29/16** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|---|---|---|---|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="checkbox"/> 0% | <input type="checkbox"/> SILT [3 pt] | <input checked="" type="checkbox"/> 10% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input checked="" type="checkbox"/> 10% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="checkbox"/> 5% |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="checkbox"/> 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="checkbox"/> 0% |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input checked="" type="checkbox"/> 40% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="checkbox"/> 0% |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input checked="" type="checkbox"/> 15% | <input type="checkbox"/> MUCK [0 pts] | <input type="checkbox"/> 0% |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input checked="" type="checkbox"/> 20% | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="checkbox"/> 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **50.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **18**

TOTAL NUMBER OF SUBSTRATE TYPES: **6**

HHEI Metric Points

Substrate Max = 40

24

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

20

COMMENTS MAXIMUM POOL DEPTH (centimeters): **40**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

| | |
|---|---|
| <input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

30

COMMENTS AVERAGE BANKFULL WIDTH (meters): **5.40**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

FLOODPLAIN QUALITY

| L | R | (Per Bank) | L | R | (Most Predominant per Bank) | L | R | |
|-------------------------------------|-------------------------------------|----------------|--------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m | <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland | <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Moderate 5-10m | <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field | <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m | <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | None | <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture | <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS **Wooded buffer tapers moving north: beyond wooded buffer are active crop areas.**

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|-------------------------------|------------------------------|---|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input checked="" type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☒ Yes ☐ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity:
Photograph Information:
Elevated Turbidity? (Y/N): Canopy (% open):
Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

76

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-003** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **44.89**

LENGTH OF STREAM REACH (ft) **5,500** LAT. **41.22840** LONG. **-83.04504** RIVER CODE RIVER MILE

DATE **09/29/16** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|---|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> SILT [3 pt] | <input type="text" value="15%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="45%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="20%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="15%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **45.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **21**TOTAL NUMBER OF SUBSTRATE TYPES: **5**

HHEI Metric Points

Substrate Max = 40

26

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

20

COMMENTS MAXIMUM POOL DEPTH (centimeters): **60**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

30

COMMENTS AVERAGE BANKFULL WIDTH (meters): **7.60**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS **Buffer between stream and crop area varies, but never less than 20 meters.**FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|------------------------------|---|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input checked="" type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

| | | | | |
|---|--|---|---|--|
| <input type="checkbox"/> Flat (0.5 ft/100 ft) | <input checked="" type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|---|--|---|---|--|

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☒ Yes ☐ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Date of last precipitation: Quantity:
Photograph Information:
Elevated Turbidity? (Y/N): Canopy (% open):
Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →





Primary Headwater Habitat Evaluation Form

39

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-004** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.30**

LENGTH OF STREAM REACH (ft) **2,538** LAT. **41.22509** LONG. **-83.04449** RIVER CODE RIVER MILE

DATE **09/29/16** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> SILT [3 pt] | <input type="text" value="20%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="40%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="35%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **15**TOTAL NUMBER OF SUBSTRATE TYPES: **4**

HHEI Metric Points

Substrate Max = 40

19

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **10**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

FLOODPLAIN QUALITY

| L | R | (Per Bank) | L | R | (Most Predominant per Bank) | L | R | |
|-------------------------------------|-------------------------------------|----------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m | <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland | <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field | <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Narrow <5m | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field | <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | None | <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture | <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS **Series of pools along the channel, with evidence of linkage during high flow**SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

| | | | | |
|---|--|---|---|--|
| <input type="checkbox"/> Flat (0.5 ft/100 ft) | <input checked="" type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|---|--|---|---|--|

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity:
Photograph Information:
Elevated Turbidity? (Y/N): Canopy (% open):
Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

78

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-005** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **3.05**

LENGTH OF STREAM REACH (ft) **560** LAT. **41.22054** LONG. **-83.05410** RIVER CODE RIVER MILE

DATE **09/29/16** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|---|---|---|---|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="checkbox"/> 0% | <input type="checkbox"/> SILT [3 pt] | <input checked="" type="checkbox"/> 20% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="checkbox"/> 0% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="checkbox"/> 5% |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="checkbox"/> 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="checkbox"/> 0% |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input checked="" type="checkbox"/> 45% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="checkbox"/> 0% |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="checkbox"/> 20% | <input type="checkbox"/> MUCK [0 pts] | <input type="checkbox"/> 0% |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="checkbox"/> 10% | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="checkbox"/> 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **45.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **18**TOTAL NUMBER OF SUBSTRATE TYPES: **5**

HHEI Metric Points

Substrate Max = 40

23

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS **Deeper pools by overpass**MAXIMUM POOL DEPTH (centimeters): **16**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

30

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS **Series of pools along the channel, with evidence of linkage during high flow**SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Watson NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 09/28/16 Quantity: 0.42
Photograph Information: 3 Photos taken, 2 upstream, 1 downstream
Elevated Turbidity? (Y/N): N Canopy (% open): 30%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

Located near active crop areas and has a road overpass.

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

52**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-006** RIVER BASIN **Beaver creek** DRAINAGE AREA (mi²) **1.73**

LENGTH OF STREAM REACH (ft) **85** LAT. **41.21086** LONG. **-83.05382** RIVER CODE RIVER MILE

DATE **09/30/16** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="35%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="15%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="25%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="20%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **15.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12

TOTAL NUMBER OF SUBSTRATE TYPES: 5

HHEI Metric Points

Substrate Max = 40

17

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

30

COMMENTS MAXIMUM POOL DEPTH (centimeters): **28**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS **Widens out by SR 778, but averages smaller** AVERAGE BANKFULL WIDTH (meters): **0.60**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream ☆

| RIPARIAN WIDTH | | FLOODPLAIN QUALITY | |
|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------|
| L | R | L | R |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

COMMENTS **To west of SR 778 lacks riparian buffer. but between SR 101/778. minor riparian area**

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|---|------------------------------|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input checked="" type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

| | | | | |
|---|--|---|---|--|
| <input type="checkbox"/> Flat (0.5 ft/100 ft) | <input checked="" type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|---|--|---|---|--|

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score 38.5 (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Watson NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
County: Seneca Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 09/29/16 Quantity: 0.23
Photograph Information: 4 Photos taken, 1 upstream, 3 downstream
Elevated Turbidity? (Y/N): N Canopy (% open): 50%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

Located near active crop and residential areas and has two road overpasses.

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

43**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-007** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **1.73**

LENGTH OF STREAM REACH (ft) **669** LAT. **41.20722** LONG. **-83.05186** RIVER CODE RIVER MILE

DATE **09/30/16** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="50%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="20%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="25%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

9

TOTAL NUMBER OF SUBSTRATE TYPES:

4**HHEI Metric Points**

Substrate Max = 40

13

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS MAXIMUM POOL DEPTH (centimeters): **16**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.60**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Date of last precipitation: Quantity:
Photograph Information:
Elevated Turbidity? (Y/N): Canopy (% open):
Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) If not, please explain:

Additional comments/description of pollution impacts: **BIOTIC EVALUATION**

Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →





Primary Headwater Habitat Evaluation Form

44**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-009** RIVER BASIN **Westerhouse Ditch** DRAINAGE AREA (mi²) **0.62**

LENGTH OF STREAM REACH (ft) **670** LAT. **41.20722** LONG. **-83.05186** RIVER CODE RIVER MILE

DATE **09/30/16** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="35%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="20%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="30%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **10.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

9

TOTAL NUMBER OF SUBSTRATE TYPES:

5**HHEI Metric Points**

Substrate Max = 40

14

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **10**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|---|--|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.20**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Watson NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 09/30/16 Quantity: 0.15
Photograph Information: 2 upstream
Elevated Turbidity? (Y/N): N Canopy (% open): 70%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Located near active crop areas.

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

66

HHEI Score (sum of metrics 1, 2, 3) :

| | | | | | |
|-----------------------------|-------------------------|-------------|-------------------|----------------------------------|-----------|
| SITE NAME/LOCATION | Apex Republic Wind Farm | | | | |
| SITE NUMBER | SOH-010 | RIVER BASIN | Westerhouse Ditch | DRAINAGE AREA (mi ²) | 8.00 |
| LENGTH OF STREAM REACH (ft) | 6,114 | LAT. | 41.17936 | LONG. | -83.00501 |
| DATE | 10/01/16 | RIVER CODE | | RIVER MILE | |
| SCORER | BJS | COMMENTS | | | |

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|---|---------|---|---------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | 0% | <input type="checkbox"/> SILT [3 pt] | 15% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | 0% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | 10% |
| <input type="checkbox"/> BEDROCK [16 pt] | 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | 0% |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | 30% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | 0% |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | 25% | <input type="checkbox"/> MUCK [0 pts] | 0% |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | 20% | <input type="checkbox"/> ARTIFICIAL [3 pts] | 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 30.00%

(A)

Substrate Percentage Check 100%

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

21

TOTAL NUMBER OF SUBSTRATE TYPES:

5

HHEI Metric Points

Substrate Max = 40

26

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

20

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

32

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS

AVERAGE BANKFULL WIDTH (meters):

2.40

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

| | | | | |
|---|--|---|---|--|
| <input type="checkbox"/> Flat (0.5 ft/100 ft) | <input checked="" type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|---|--|---|---|--|

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☒ Yes ☐ No QHEI Score 51.0 (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: Watson NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 09/30/16 Quantity: 0.15
Photograph Information: 3 photos taken, 1 upstream, 1 downstream and 1 cross channel
Elevated Turbidity? (Y/N): N Canopy (% open): 40%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain: Additional comments/description of pollution impacts: Located near active crop areas.**BIOTIC EVALUATION**Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

71

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-011** RIVER BASIN **Westerhouse Ditch** DRAINAGE AREA (mi²) **10.28**

LENGTH OF STREAM REACH (ft) **2,915** LAT. **41.19532** LONG. **-83.01085** RIVER CODE RIVER MILE

DATE **10/01/16** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|---|---|---|---|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="checkbox"/> 0% | <input type="checkbox"/> SILT [3 pt] | <input checked="" type="checkbox"/> 15% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="checkbox"/> 0% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input checked="" type="checkbox"/> 10% |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="checkbox"/> 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="checkbox"/> 0% |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input checked="" type="checkbox"/> 30% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="checkbox"/> 0% |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input checked="" type="checkbox"/> 25% | <input type="checkbox"/> MUCK [0 pts] | <input type="checkbox"/> 0% |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input checked="" type="checkbox"/> 20% | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="checkbox"/> 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **30.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **21**

TOTAL NUMBER OF SUBSTRATE TYPES: **5**

HHEI Metric Points

Substrate Max = 40

26

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

20

COMMENTS MAXIMUM POOL DEPTH (centimeters): **45**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

25

COMMENTS AVERAGE BANKFULL WIDTH (meters): **3.70**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Moderate 5-10m |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☒ Yes ☐ No QHEI Score **61.5** (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: **Watson** NRCS Soil Map Page: NRCS Soil Map Stream Order
County: **Seneca** Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): **Y** Date of last precipitation: **09/30/16** Quantity: **0.15**
Photograph Information: **6 photos taken, 2 upstream, 2 downstream and 2 cross channel**
Elevated Turbidity? (Y/N): **N** Canopy (% open): **10%**
Were samples collected for water chemistry? (Y/N): **N** (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) **Y** If not, please explain: Additional comments/description of pollution impacts: **Located near active crop areas.****BIOTIC EVALUATION**Performed? (Y/N): **N** (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) **N** Voucher? (Y/N) **N** Salamanders Observed? (Y/N) **N** Voucher? (Y/N) **N**
Frogs or Tadpoles Observed? (Y/N) **N** Voucher? (Y/N) **N** Aquatic Macroinvertebrates Observed? (Y/N) **N** Voucher? (Y/N) **N**
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

60

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Apex Republic Wind Farm**SITE NUMBER **SOH-014**RIVER BASIN **Westerhouse Ditch**DRAINAGE AREA (mi²) **15.73**LENGTH OF STREAM REACH (ft) **4,214**LAT. **41.19918**LONG. **-83.01323**

RIVER CODE

RIVER MILE

DATE **10/02/16**SCORER **BJS**

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL
MODIFICATIONS:☐ NONE / NATURAL CHANNEL☐ RECOVERED☒ RECOVERING☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

| | |
|-------------------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |

BLDR SLABS [16 pts]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pts]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [9 pts]

SAND (<2 mm) [6 pts]

PERCENT

| | |
|-------------------------------------|------------|
| <input type="checkbox"/> | 0% |
| <input type="checkbox"/> | 0% |
| <input type="checkbox"/> | 0% |
| <input type="checkbox"/> | 15% |
| <input checked="" type="checkbox"/> | 30% |
| <input checked="" type="checkbox"/> | 25% |

TYPE

| | |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

SILT [3 pt]

LEAF PACK/WOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pt]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

| | |
|--------------------------|------------|
| <input type="checkbox"/> | 20% |
| <input type="checkbox"/> | 10% |
| <input type="checkbox"/> | 0% |
| <input type="checkbox"/> | 0% |
| <input type="checkbox"/> | 0% |
| <input type="checkbox"/> | 0% |

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock **15.00%**

(A)

Substrate Percentage
Check**100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **15**TOTAL NUMBER OF SUBSTRATE TYPES: **5**HHEI
Metric
PointsSubstrate
Max = 40**20**

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

> 30 centimeters [20 pts]

> 22.5 - 30 cm [30 pts]

> 10 - 22.5 cm [25 pts]

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

> 5 cm - 10 cm [15 pts]

< 5 cm [5 pts]

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters): **45**Pool Depth
Max = 30**20**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

> 4.0 meters (> 13') [30 pts]

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

> 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters): **2.00**Bankfull
Width
Max=30**20**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| | |
|-------------------------------------|-------------------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

(Per Bank)

Wide >10m

Moderate 5-10m

Narrow <5m

None

COMMENTS

FLOODPLAIN QUALITY

| | |
|--------------------------|--------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

(Most Predominant per Bank)

Mature Forest, Wetland

Immature Forest, Shrub or Old Field

Residential, Park, New Field

Fenced Pasture

| | |
|-------------------------------------|-------------------------------------|
| L | R |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

Conservation Tillage

Urban or Industrial

Open Pasture, Row Crop

Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

Stream Flowing

Subsurface flow with isolated pools (Interstitial)

COMMENTS

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

Moist Channel, isolated pools, no flow (Intermittent)

Dry channel, no water (Ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

None

0.5

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |
| <input type="checkbox"/> |

1.0

1.5

| |
|-------------------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input checked="" type="checkbox"/> |

2.0

2.5

| |
|--------------------------|
| <input type="checkbox"/> |
| <input type="checkbox"/> |
| <input type="checkbox"/> |

3.0

>3

STREAM GRADIENT ESTIMATE

☐

Flat (0.5 ft/100 ft)

☒

Flat to Moderate

☐

Moderate (2 ft/100 ft)

☐

Moderate to Severe

☐

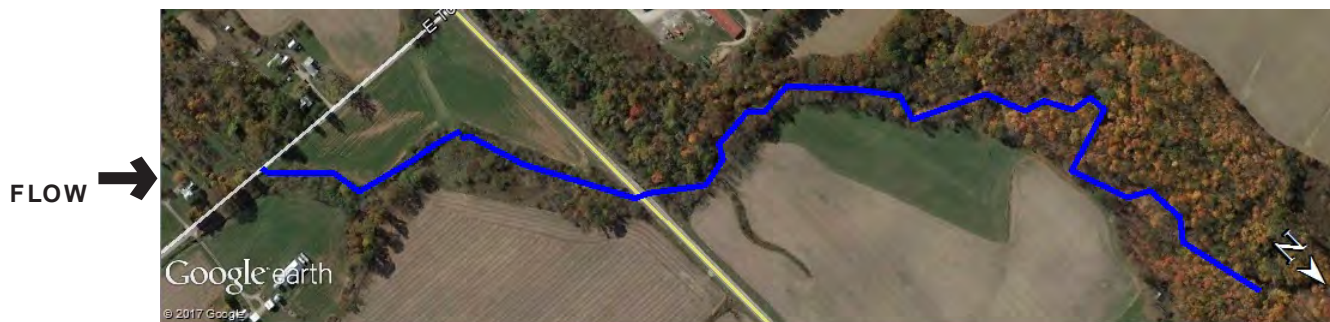
Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☒ Yes ☐ No QHEI Score 52.0 (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: Watson NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/01/16 Quantity: 0.37
Photograph Information: 4 photos taken, 2 downstream and 2 upstream
Elevated Turbidity? (Y/N): N Canopy (% open): 30%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain: Additional comments/description of pollution impacts: Located near active crop areas and a road crossing**BIOTIC EVALUATION**Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

60**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-015** RIVER BASIN **Westerhouse Ditch** DRAINAGE AREA (mi²) **4.44**

LENGTH OF STREAM REACH (ft) **2,402** LAT. **41.20081** LONG. **-83.00001** RIVER CODE RIVER MILE

DATE **10/02/16** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|---|------------|---|-----------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | 0% | <input type="checkbox"/> SILT [3 pt] | 5% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | 0% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | 0% |
| <input type="checkbox"/> BEDROCK [16 pt] | 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | 0% |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | 65% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | 0% |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | 15% | <input type="checkbox"/> MUCK [0 pts] | 0% |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | 15% | <input type="checkbox"/> ARTIFICIAL [3 pts] | 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **65.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

21

TOTAL NUMBER OF SUBSTRATE TYPES:

4**HHEI Metric Points**

Substrate Max = 40

25

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **10**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **2.30**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity:
Photograph Information:
Elevated Turbidity? (Y/N): Canopy (% open):
Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

45**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-016** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **13.98**

LENGTH OF STREAM REACH (ft) **2,643** LAT. **41.21080** LONG. **-82.89879** RIVER CODE RIVER MILE

DATE **10/04/16** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|---|---|---|-----------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="checkbox"/> 0% | <input type="checkbox"/> SILT [3 pt] | <input type="checkbox"/> 5% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="checkbox"/> 0% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="checkbox"/> 0% |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="checkbox"/> 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="checkbox"/> 0% |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input checked="" type="checkbox"/> 65% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="checkbox"/> 0% |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input checked="" type="checkbox"/> 15% | <input type="checkbox"/> MUCK [0 pts] | <input type="checkbox"/> 0% |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input checked="" type="checkbox"/> 15% | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="checkbox"/> 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **65.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

21

TOTAL NUMBER OF SUBSTRATE TYPES:

4**HHEI Metric Points**

Substrate Max = 40

25

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

0

COMMENTS MAXIMUM POOL DEPTH (centimeters): **0**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.80**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

FLOODPLAIN QUALITY

| L | R | (Per Bank) | L | R | (Most Predominant per Bank) | L | R | |
|-------------------------------------|-------------------------------------|----------------|--------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m | <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland | <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m | <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field | <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m | <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None | <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture | <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|--|------------------------------|------------------------------|------------------------------|
| <input checked="" type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

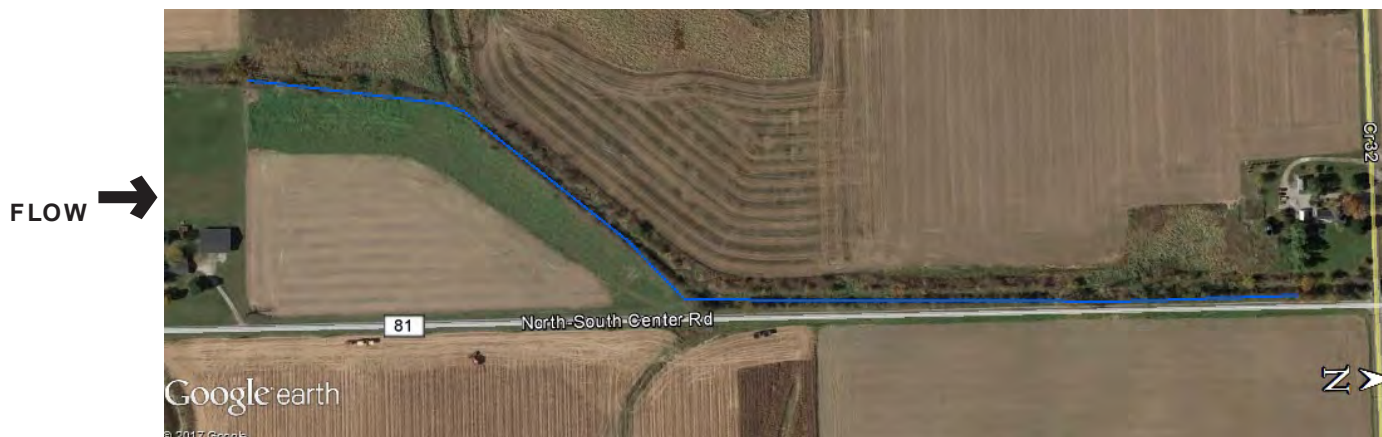
☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

32

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-017** RIVER BASIN **Westerhouse Ditch** DRAINAGE AREA (mi²) **1.16**

LENGTH OF STREAM REACH (ft) **3,094** LAT. **41.18723** LONG. **-82.95322** RIVER CODE RIVER MILE

DATE **10/04/16** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="65%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="15%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="20%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**TOTAL NUMBER OF SUBSTRATE TYPES: **3**

HHEI Metric Points

Substrate Max = 40

12

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

0

COMMENTS MAXIMUM POOL DEPTH (centimeters): **0**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **3.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/02/16 Quantity: 0.06
Photograph Information: 3 photos taken, 1 upstream, 1 downstream, and 1 cross channel
Elevated Turbidity? (Y/N): N Canopy (% open): 85%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Located near active crop areas.

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

27

HHEI Score (sum of metrics 1, 2, 3) :

| | | | | | | |
|-----------------------------|--|-------------------------|-------------|--------------|----------------------------------|-----------|
| SITE NAME/LOCATION | | Apex Republic Wind Farm | | | | |
| SITE NUMBER | | SOH-018 | RIVER BASIN | Beaver Creek | DRAINAGE AREA (mi ²) | 13.73 |
| LENGTH OF STREAM REACH (ft) | | 5,888 | LAT. | 41.20600 | LONG. | -82.90061 |
| RIVER CODE | | | RIVER MILE | | | |
| DATE | | 10/05/16 | SCORER | BJS | COMMENTS | |

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------|---|---------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | 0% | <input checked="" type="checkbox"/> SILT [3 pt] | 65% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | 0% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | 0% |
| <input type="checkbox"/> BEDROCK [16 pt] | 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | 0% |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | 0% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | 0% |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | 15% | <input type="checkbox"/> MUCK [0 pts] | 0% |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | 20% | <input type="checkbox"/> ARTIFICIAL [3 pts] | 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0.00%

(A)

Substrate Percentage Check 100%

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 9

TOTAL NUMBER OF SUBSTRATE TYPES: 3

HHEI Metric Points

Substrate Max = 40

12

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

0

COMMENTS: MAXIMUM POOL DEPTH (centimeters): 0

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS: AVERAGE BANKFULL WIDTH (meters): 1.50

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

COMMENTS:

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS:

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

| | | | | |
|---|--|---|---|--|
| <input type="checkbox"/> Flat (0.5 ft/100 ft) | <input checked="" type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|---|--|---|---|--|

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/02/16 Quantity: 0.06
Photograph Information: 2 photos taken, 1 upstream and 1 downstream
Elevated Turbidity? (Y/N): N Canopy (% open): 60%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Located near active crop areas.

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

61**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-19** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **2.52**

LENGTH OF STREAM REACH (ft) **555** LAT. **41.21316** LONG. **-83.05617** RIVER CODE RIVER MILE

DATE **09/30/16** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|---|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> SILT [3 pt] | <input type="text" value="20%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="25%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="30%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="20%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **25.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

21

TOTAL NUMBER OF SUBSTRATE TYPES:

5**HHEI Metric Points**

Substrate Max = 40

26

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

20

COMMENTS MAXIMUM POOL DEPTH (centimeters): **35**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|---|--|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS **Widens out on average north of CR 44** AVERAGE BANKFULL WIDTH (meters): **1.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream ☆

| RIPARIAN WIDTH | | FLOODPLAIN QUALITY | | | |
|--------------------------|--------------------------|--|--------------------------|--------------------------|--------------------------|
| L | R | L | R | | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | |
| (Per Bank) Wide >10m | | (Most Predominant per Bank) Mature Forest, Wetland | | <input type="checkbox"/> | <input type="checkbox"/> |
| Moderate 5-10m | | Immature Forest, Shrub or Old Field | | <input type="checkbox"/> | <input type="checkbox"/> |
| Narrow <5m | | Residential, Park, New Field | | <input type="checkbox"/> | <input type="checkbox"/> |
| None | | Fenced Pasture | | <input type="checkbox"/> | <input type="checkbox"/> |

COMMENTS **North of CR 44 has minor buffer, but south of CR44 has none**

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):**

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

- SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):**

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: **Watson** NRCS Soil Map Page: NRCS Soil Map Stream Order
County: **Seneca** Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): **Y** Date of last precipitation: **09/29/16** Quantity: **0.23**
Photograph Information: **2 Photos taken, 1 upstream, 1 downstream**
Elevated Turbidity? (Y/N): **N** Canopy (% open): **50%**
Were samples collected for water chemistry? (Y/N): **N** (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) **Y** If not, please explain:

Additional comments/description of pollution impacts:

Located near active crop and residential areas and has a road overpasses.

BIOTIC EVALUATION

Performed? (Y/N): **N** (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) **N** Voucher? (Y/N) **N** Salamanders Observed? (Y/N) **N** Voucher? (Y/N) **N**
Frogs or Tadpoles Observed? (Y/N) **N** Voucher? (Y/N) **N** Aquatic Macroinvertebrates Observed? (Y/N) **N** Voucher? (Y/N) **N**
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

34

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-100** RIVER BASIN **Sugar Creek** DRAINAGE AREA (mi²) **0.00**

LENGTH OF STREAM REACH (ft) **117** LAT. **41.19953** LONG. **-83.09697** RIVER CODE RIVER MILE

DATE **04/08/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="60%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="10%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="15%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **5.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**

TOTAL NUMBER OF SUBSTRATE TYPES: **5**

HHEI Metric Points

Substrate Max = 40

14

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **6**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS **Located in woodlot, drains field**

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|---|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input checked="" type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☒ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Watson NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/05/17 Quantity: 0.54
Photograph Information: Representative Photos Taken
Elevated Turbidity? (Y/N): N Canopy (% open): 5%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Nearby road and crop areas

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

43

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-101** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.20**

LENGTH OF STREAM REACH (ft) **1,610** LAT. **41.22957** LONG. **-83.04101** RIVER CODE RIVER MILE

DATE **04/11/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="80%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**TOTAL NUMBER OF SUBSTRATE TYPES: **4**

HHEI Metric Points

Substrate Max = 40

13

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS MAXIMUM POOL DEPTH (centimeters): **15**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS **Located in woodlot near farm field**FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☒ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts:
BIOTIC EVALUATIONPerformed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology:
DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW →





Primary Headwater Habitat Evaluation Form

48

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Apex Republic Wind Farm**SITE NUMBER **SOH-102**RIVER BASIN **Beaver Creek**DRAINAGE AREA (mi²) **0.08**LENGTH OF STREAM REACH (ft) **192**LAT. **41.23104**LONG. **-83.03892**

RIVER CODE

RIVER MILE

DATE **04/11/17**SCORER **BJS**

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL
MODIFICATIONS:☐ NONE / NATURAL CHANNEL☐ RECOVERED☐ RECOVERING☒ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|--|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="95%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage
Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

6

TOTAL NUMBER OF SUBSTRATE TYPES:

2HHEI
Metric
PointsSubstrate
Max = 40**8**

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth
Max = 30**15**

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

10

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull
Width
Max=30**25**COMMENTS **Wide/braided, shallow poorly defined channel.**

AVERAGE BANKFULL WIDTH (meters):

4.00

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS **Located in woodlot near farm field**FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Watson NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/10/17 Quantity: 0.09
Photograph Information: Representative Photos Taken
Elevated Turbidity? (Y/N): N Canopy (% open): 0%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

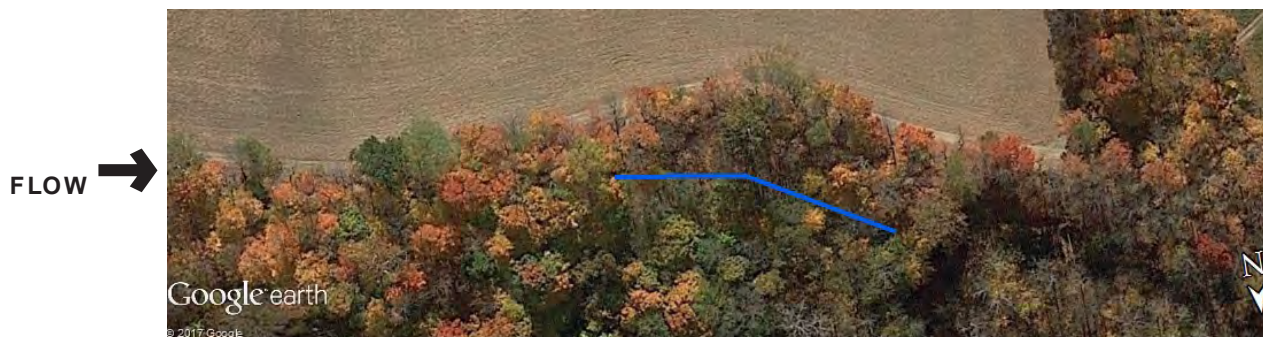
Additional comments/description of pollution impacts:
 Nearby crop areas. Fed by tile.

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

70

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-103** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.53**

LENGTH OF STREAM REACH (ft) **733** LAT. **41.21351** LONG. **-83.04254** RIVER CODE RIVER MILE

DATE **04/12/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|---|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="70%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="15%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **15.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **15**

TOTAL NUMBER OF SUBSTRATE TYPES: **5**

HHEI Metric Points

Substrate Max = 40

20

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

30

COMMENTS MAXIMUM POOL DEPTH (centimeters): **30**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.70**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

34

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-104** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.00**

LENGTH OF STREAM REACH (ft) **343** LAT. **41.21319** LONG. **-83.04163** RIVER CODE RIVER MILE

DATE **04/12/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="75%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **5.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**

TOTAL NUMBER OF SUBSTRATE TYPES: **5**

HHEI Metric Points

Substrate Max = 40

14

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **10**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|---|---|---|--|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input checked="" type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input checked="" type="checkbox"/> 2.5 | <input checked="" type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: **Watson** NRCS Soil Map Page: NRCS Soil Map Stream Order
County: **Seneca** Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): **Y** Date of last precipitation: **04/11/17** Quantity: **0.05**
Photograph Information: **Representative Photos Taken**
Elevated Turbidity? (Y/N): **N** Canopy (% open): **10%**
Were samples collected for water chemistry? (Y/N): **N** (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) **Y** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): **N** (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) **N** Voucher? (Y/N) **N** Salamanders Observed? (Y/N) **N** Voucher? (Y/N) **N**
Frogs or Tadpoles Observed? (Y/N) **N** Voucher? (Y/N) **N** Aquatic Macroinvertebrates Observed? (Y/N) **N** Voucher? (Y/N) **N**
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

34

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-105** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.00**

LENGTH OF STREAM REACH (ft) **139** LAT. **41.20374** LONG. **-83.04634** RIVER CODE RIVER MILE

DATE **04/12/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="70%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="10%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **5.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**

TOTAL NUMBER OF SUBSTRATE TYPES: **5**

HHEI Metric Points

Substrate Max = 40

14

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **8**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|------------------------------|---|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input checked="" type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City:

MISCELLANEOUSBase Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

| | | | | | | | |
|-----------------------------------|--------------------------------|----------------|--------------------------------|--|--------------------------------|----------------|--------------------------------|
| Fish Observed? (Y/N) | <input type="text" value="N"/> | Voucher? (Y/N) | <input type="text" value="N"/> | Salamanders Observed? (Y/N) | <input type="text" value="N"/> | Voucher? (Y/N) | <input type="text" value="N"/> |
| Frogs or Tadpoles Observed? (Y/N) | <input type="text" value="N"/> | Voucher? (Y/N) | <input type="text" value="N"/> | Aquatic Macroinvertebrates Observed? (Y/N) | <input type="text" value="N"/> | Voucher? (Y/N) | <input type="text" value="N"/> |

Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

24

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-106** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.00**

LENGTH OF STREAM REACH (ft) **458** LAT. **41.20368** LONG. **-83.04664** RIVER CODE RIVER MILE

DATE **04/12/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="70%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="10%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **5.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**

TOTAL NUMBER OF SUBSTRATE TYPES: **5**

HHEI Metric Points

Substrate Max = 40

14

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input checked="" type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

5

COMMENTS MAXIMUM POOL DEPTH (centimeters): **5**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **0.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|------------------------------|---|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input checked="" type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

38

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-107** RIVER BASIN **Morrison Creek** DRAINAGE AREA (mi²) **0.00**

LENGTH OF STREAM REACH (ft) **258** LAT. **41.15281** LONG. **-82.98597** RIVER CODE RIVER MILE

DATE **04/27/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|--|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="70%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="30%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**

TOTAL NUMBER OF SUBSTRATE TYPES: **2**

HHEI Metric Points

Substrate Max = 40

8

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **10**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.20**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/27/07 Quantity: 0.07

Photograph Information: Representative Photos Taken

Elevated Turbidity? (Y/N): N Canopy (% open): 0%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:

Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)

Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Nearby road and crop areas

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N

Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

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HHEI Score (sum of metrics 1, 2, 3) :

| | | | | | |
|-----------------------------|-------------------------|-------------|-------------------|----------------------------------|-----------|
| SITE NAME/LOCATION | Apex Republic Wind Farm | | | | |
| SITE NUMBER | SOH-108 | RIVER BASIN | Westerhouse Ditch | DRAINAGE AREA (mi ²) | 0.00 |
| LENGTH OF STREAM REACH (ft) | 333 | LAT. | 41.19504 | LONG. | -83.01710 |
| DATE | 04/25/17 | RIVER CODE | | RIVER MILE | |
| SCORER | BJS | COMMENTS | | | |

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|--|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="85%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="10%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock

(A)

Substrate Percentage Check

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

6

TOTAL NUMBER OF SUBSTRATE TYPES:

3

HHEI Metric Points

Substrate Max = 40

9

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input checked="" type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

5

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

5

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS

AVERAGE BANKFULL WIDTH (meters):

1.20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

| | | | | |
|---|--|---|---|--|
| <input type="checkbox"/> Flat (0.5 ft/100 ft) | <input checked="" type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|---|--|---|---|--|

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Watson NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/20/17 Quantity: 0.21
Photograph Information: Representative Photos Taken
Elevated Turbidity? (Y/N): N Canopy (% open): 5%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Crop area upslope

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

18

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-109** RIVER BASIN **Sugar Creek** DRAINAGE AREA (mi²) **0.05**

LENGTH OF STREAM REACH (ft) **327** LAT. **41.18208** LONG. **-83.02568** RIVER CODE RIVER MILE

DATE **04/26/17** SCORER **BJS** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|--|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="90%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="10%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6**

TOTAL NUMBER OF SUBSTRATE TYPES: **2**

HHEI Metric Points

Substrate Max = 40

8

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input checked="" type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

5

COMMENTS MAXIMUM POOL DEPTH (centimeters): **5**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|---|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input checked="" type="checkbox"/> 0.5 | <input checked="" type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Watson NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/20/17 Quantity: 0.21
Photograph Information: Representative Photos Taken
Elevated Turbidity? (Y/N): N Canopy (% open): 5%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Crop area upslope

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

74**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-154** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **3.36**

LENGTH OF STREAM REACH (ft) **3,781** LAT. **41.16722** LONG. **-82.89357** RIVER CODE RIVER MILE

DATE **10/17/17** SCORER **MAM** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|---|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="55%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="5%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="30%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **30.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 15

TOTAL NUMBER OF SUBSTRATE TYPES: 4

HHEI Metric Points

Substrate Max = 40

19

A + B

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

30

COMMENTS MAXIMUM POOL DEPTH (centimeters): **30**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|---|---|
| <input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

25

COMMENTS AVERAGE BANKFULL WIDTH (meters): **4.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

| RIPARIAN WIDTH | | FLOODPLAIN QUALITY | | | | |
|-------------------------------------|-------------------------------------|--|-------------------------------------|--------------------------|--------------------------|------------------------|
| L | R | L | R | | | |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | |
| (Per Bank) Wide >10m | | (Most Predominant per Bank) Mature Forest, Wetland | | <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| Moderate 5-10m | | Immature Forest, Shrub or Old Field | | <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| Narrow <5m | | Residential, Park, New Field | | <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| None | | Fenced Pasture | | <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):**

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

- SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):**

| | | | |
|---|------------------------------|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input checked="" type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/12/17 Quantity: 0.02
Photograph Information:
Elevated Turbidity? (Y/N): N Canopy (% open): 40%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

16

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-158** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.11**

LENGTH OF STREAM REACH (ft) **234** LAT. **41.18183** LONG. **-82.87481** RIVER CODE RIVER MILE

DATE **10/17/17** SCORER **MAM** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS:

☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="95%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **9**

TOTAL NUMBER OF SUBSTRATE TYPES: **2**

HHEI Metric Points

Substrate Max = 40

11

A + B

Pool Depth Max = 30

0

Bankfull Width Max=30

5

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

COMMENTS

MAXIMUM POOL DEPTH (centimeters): **0**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

COMMENTS

AVERAGE BANKFULL WIDTH (meters): **0.90**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS **Historic stream modified for drainage**

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/12/17 Quantity: 0.02
Photograph Information: 3 photos
Elevated Turbidity? (Y/N): N Canopy (% open): 0%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain: Additional comments/description of pollution impacts: tile discharge**BIOTIC EVALUATION**Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

52**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-167** RIVER BASIN **Westerhouse ditch** DRAINAGE AREA (mi²) **0.90**

LENGTH OF STREAM REACH (ft) **1,915** LAT. **41.14564** LONG. **-82.93163** RIVER CODE RIVER MILE

DATE **10/19/17** SCORER **MAM** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="90%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

9

TOTAL NUMBER OF SUBSTRATE TYPES:

3**HHEI Metric Points**

Substrate Max = 40

12**A + B**

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

25

COMMENTS MAXIMUM POOL DEPTH (centimeters): **20**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|---|--|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

15

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.50**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|---|------------------------------|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input checked="" type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity:
Photograph Information:
Elevated Turbidity? (Y/N): Canopy (% open):
Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

52**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-200** RIVER BASIN **Pickereel Creek** DRAINAGE AREA (mi²) **0.18**

LENGTH OF STREAM REACH (ft) **102** LAT. **41.21888** LONG. **-82.86025** RIVER CODE RIVER MILE

DATE **04/07/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☒ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="85%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="5%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="10%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

9

TOTAL NUMBER OF SUBSTRATE TYPES:

3**HHEI Metric Points**

Substrate Max = 40

12**A + B**

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

20

COMMENTS MAXIMUM POOL DEPTH (centimeters): **60**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

20

COMMENTS AVERAGE BANKFULL WIDTH (meters): **2.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

| | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Date of last precipitation: Quantity: Photograph Information: Elevated Turbidity? (Y/N): Canopy (% open): Were samples collected for water chemistry? (Y/N): (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: **BIOTIC EVALUATION**Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N) Comments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

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HHEI Score (sum of metrics 1, 2, 3) :

| | | | | | |
|-----------------------------|-------------------------|-------------|--------------|----------------------------------|-----------|
| SITE NAME/LOCATION | Apex Republic Wind Farm | | | | |
| SITE NUMBER | SOH-201 | RIVER BASIN | Beaver Creek | DRAINAGE AREA (mi ²) | 3.61 |
| LENGTH OF STREAM REACH (ft) | 5,472 | LAT. | 41.18233 | LONG. | -82.93057 |
| DATE | 04/14/17 | RIVER CODE | | RIVER MILE | |
| SCORER | BH | COMMENTS | | | |

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☒ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|---------|---|---------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | 10% | <input checked="" type="checkbox"/> SILT [3 pt] | 60% |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | 0% | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | 0% |
| <input type="checkbox"/> BEDROCK [16 pt] | 0% | <input type="checkbox"/> FINE DETRITUS [3 pts] | 0% |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | 5% | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | 0% |
| <input type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | 5% | <input type="checkbox"/> MUCK [0 pts] | 0% |
| <input checked="" type="checkbox"/> SAND (<2 mm) [6 pts] | 20% | <input type="checkbox"/> ARTIFICIAL [3 pts] | 0% |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 15.00%

(A)

Substrate Percentage Check 100%

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 9

TOTAL NUMBER OF SUBSTRATE TYPES: 5

HHEI Metric Points

Substrate Max = 40

14

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

20

COMMENTS: MAXIMUM POOL DEPTH (centimeters): 32

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

25

COMMENTS: AVERAGE BANKFULL WIDTH (meters): 3.10

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

FLOODPLAIN QUALITY

| L | R | (Per Bank) | L | R | (Most Predominant per Bank) | L | R | |
|-------------------------------------|-------------------------------------|----------------|--------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m | <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland | <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m | <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field | <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m | <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | None | <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture | <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS:

FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS:

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

| | | | | |
|--|---|---|---|--|
| <input checked="" type="checkbox"/> Flat (0.5 ft/100 ft) | <input type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|--|---|---|---|--|

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | |
|---|---|
| <input type="checkbox"/> WWH Name: <input type="text"/> | Distance from Evaluated Stream <input type="text"/> |
| <input type="checkbox"/> CWH Name: <input type="text"/> | Distance from Evaluated Stream <input type="text"/> |
| <input type="checkbox"/> EWH Name: <input type="text"/> | Distance from Evaluated Stream <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/11/17 Quantity: 0.05Photograph Information: Representative Photos TakenElevated Turbidity? (Y/N): N Canopy (% open): 5%Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) Y If not, please explain: Additional comments/description of pollution impacts: Crop area upslope**BIOTIC EVALUATION**Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) NComments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

26**HHEI Score (sum of metrics 1, 2, 3) :**

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-202** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.00**

LENGTH OF STREAM REACH (ft) **153** LAT. **41.18198** LONG. **-82.93081** RIVER CODE RIVER MILE

DATE **04/26/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

- 1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.**

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="30%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="10%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="40%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="20%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** (A) Substrate Percentage Check **100%** (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 **TOTAL NUMBER OF SUBSTRATE TYPES: 4**

HHEI Metric Points**Substrate Max = 40****16****A + B**

- 2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):**

| | |
|--|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input checked="" type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30**5**

COMMENTS MAXIMUM POOL DEPTH (centimeters): **3**

- 3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):**

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30**5**

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream ☆

| RIPARIAN WIDTH | | FLOODPLAIN QUALITY | |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| L | R | L | R |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| (Per Bank) | | (Most Predominant per Bank) | |
| Wide >10m | | Mature Forest, Wetland | <input type="checkbox"/> |
| Moderate 5-10m | | Immature Forest, Shrub or Old Field | <input type="checkbox"/> |
| Narrow <5m | | Residential, Park, New Field | <input type="checkbox"/> |
| None | | Fenced Pasture | <input type="checkbox"/> |
| | | | <input type="checkbox"/> |
| | | | <input type="checkbox"/> |
| | | | <input type="checkbox"/> |
| | | | <input type="checkbox"/> |

COMMENTS

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):**

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

- SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):**

| | | | |
|-------------------------------|------------------------------|------------------------------|---|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input checked="" type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream
☐ CWH Name: Distance from Evaluated Stream
☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Fireside NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Seneca Township / City:

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 04/20/17 Quantity: 0.21
Photograph Information: Representative Photos Taken
Elevated Turbidity? (Y/N): N Canopy (% open): 5%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:

Additional comments/description of pollution impacts:
 Crop area upslope

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

36

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION **Apex Republic Wind Farm**

SITE NUMBER **SOH-203** RIVER BASIN **Beaver Creek** DRAINAGE AREA (mi²) **0.05**

LENGTH OF STREAM REACH (ft) **255** LAT. **41.18142** LONG. **-82.93387** RIVER CODE RIVER MILE

DATE **04/27/17** SCORER **BH** COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

| TYPE | PERCENT | TYPE | PERCENT |
|--|----------------------------------|---|----------------------------------|
| <input type="checkbox"/> BLDR SLABS [16 pts] | <input type="text" value="0%"/> | <input checked="" type="checkbox"/> SILT [3 pt] | <input type="text" value="30%"/> |
| <input type="checkbox"/> BOULDER (>256 mm) [16 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts] | <input type="text" value="10%"/> |
| <input type="checkbox"/> BEDROCK [16 pt] | <input type="text" value="0%"/> | <input type="checkbox"/> FINE DETRITUS [3 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> COBBLE (65-256 mm) [12 pts] | <input type="text" value="0%"/> | <input type="checkbox"/> CLAY or HARDPAN [0 pt] | <input type="text" value="0%"/> |
| <input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts] | <input type="text" value="40%"/> | <input type="checkbox"/> MUCK [0 pts] | <input type="text" value="0%"/> |
| <input type="checkbox"/> SAND (<2 mm) [6 pts] | <input type="text" value="20%"/> | <input type="checkbox"/> ARTIFICIAL [3 pts] | <input type="text" value="0%"/> |

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%**

(A)

Substrate Percentage Check **100%**

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **12**TOTAL NUMBER OF SUBSTRATE TYPES: **4**

HHEI Metric Points

Substrate Max = 40

16

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

| | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

15

COMMENTS MAXIMUM POOL DEPTH (centimeters): **10**

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

| | |
|---|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] | |

Bankfull Width Max=30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): **1.00**

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream ☆

RIPARIAN WIDTH

| L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

FLOODPLAIN QUALITY

| L | R | (Most Predominant per Bank) |
|-------------------------------------|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

| L | R | |
|--------------------------|--------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input type="checkbox"/> | <input type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

COMMENTS FLOW REGIME (At Time of Evaluation) (Check *ONLY* one box):

| | |
|---|--|
| <input type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input checked="" type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

| | | | |
|-------------------------------|------------------------------|------------------------------|---|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input checked="" type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

| | | | | |
|---|--|---|---|--|
| <input type="checkbox"/> Flat (0.5 ft/100 ft) | <input checked="" type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|---|--|---|---|--|

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

| | | | |
|------------------------------------|----------------------|--------------------------------|----------------------|
| <input type="checkbox"/> WWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> CWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |
| <input type="checkbox"/> EWH Name: | <input type="text"/> | Distance from Evaluated Stream | <input type="text"/> |

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: **Fireside** NRCS Soil Map Page: NRCS Soil Map Stream Order
County: **Seneca** Township / City: **MISCELLANEOUS**Base Flow Conditions? (Y/N): ☒ Y Date of last precipitation: **04/27/17** Quantity: **0.07**Photograph Information: **Representative Photos Taken**Elevated Turbidity? (Y/N): ☒ N Canopy (% open): **5%**Were samples collected for water chemistry? (Y/N): ☒ N (Note lab sample no. or id. and attach results) Lab Number: Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm) Is the sampling reach representative of the stream (Y/N) ☒ Y If not, please explain: Additional comments/description of pollution impacts:
Crop area upslope**BIOTIC EVALUATION**Performed? (Y/N): ☒ N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Salamanders Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N
Frogs or Tadpoles Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ N Aquatic Macroinvertebrates Observed? (Y/N) ☒ N Voucher? (Y/N) ☒ NComments Regarding Biology: **DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):**

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



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Summary: Application Exhibit F Appendix H - Part 14 of 14 electronically filed by Teresa Orahod on behalf of Sally W. Bloomfield