

NEW YORK STATE | Department of Environmental Conservation

Angler Use and Wild Trout Young of Year Recruitment

EVALUATING NEW YORK'S INLAND TROUT STREAM CATCH AND RELEASE SEASON

JULY 2021

Andrew M. Cuomo, Governor | Basil Seggos, Commissioner

Need

The New York State Trout Stream Management Plan (TSMP) (NYSDEC, 2020) established a statewide catch-and-release (artificial lures only) season from October 16-March 31, allowing for year-round fishing. Previously, the trout fishing season for most inland trout streams was closed from October 16-March 31. Some anglers have raised concerns that the reproductive success of wild trout could be reduced due to catching and handling spawning trout and increased mortality of trout eggs exposed to wading anglers. The risks of year-round trout fishing considered by DEC in deciding to introduce the new catch-and-release season are summarized in Appendix 1 of the TSMP. While there is evidence that negative effects on wild trout populations are unlikely to occur, a study that assesses if angling pressure during trout spawning and egg development negatively impacts young of year production of fall spawning trout[1] is needed to evaluate management actions and address angler concerns.

Study Objectives

1. Estimate angling pressure on a statewide sample of trout stream reaches during the fall period formerly closed to fishing under statewide regulation.

2. Determine if the angling pressure on wild stream reaches during the catch-and-release/spawning season negatively impacts young of year (YOY) trout production.

3. Assess the extent of localized differences in the impact of angling regarding YOY trout production during the period formerly closed to fishing under statewide regulation.

Study Area

All DEC Regions except Region 2.

Actions

1. Select representative *Wild, Wild-Quality* and *Wild-Premier* stream reaches statewide for inclusion in the study with input from interested anglers (Regional and Central Office responsibility)
2. Develop standard randomized pressure survey schedule (Central Office Responsibility)

[1] The study focuses on fall spawners because springtime rainbow trout spawning and egg incubation in New York State typically extends well beyond the previous April 1 opening date of trout season. (Smith, 1985)

3. Conduct angler pressure surveys on the selected stream reaches from October 16 to December 15 in 2021, 2022 and 2023. (Regional responsibility)
4. Conduct YOY relative abundance surveys (electrofishing) on the selected stream reaches during late August/early September in 2021, 2022, 2023 and 2024. Calculate CPUE and abundance estimates. (Regional responsibility)
5. Install a temperature logger on at least one study reach per region[2] to record thalweg water temperatures between June 11 and the date of the YOY survey. (Regional responsibility)
6. Write a final comprehensive report by December 31, 2024. (Central Office responsibility)

Methods

Reach Selection

Regional fisheries managers selected a total of 19 study stream reaches statewide for inclusion in the study (Appendix 1). Proposed reaches were reviewed by Central Office and the TSMP Focus Group. The following criteria were used to make the final selection:

- Reaches must support naturally reproducing brook trout and/or brown trout, categorized as *Wild*, *Wild-Quality* or *Wild-Premier*,
- Reaches likely to attract significant angler use from October 16-March 31 (e.g., high use during traditional season, opportunity to catch large mature trout, easy public access, proximity to population center, etc.) are preferred,
- Reaches must accommodate angler counts that can be readily completed from the road or vantage points accessible within a short walk from vehicle[3],
- Reaches must afford agents the ability to reasonably conduct two count runs per day on the reach (or cluster of nearby reaches) during the above time periods,
- Reaches must include spawning/YOY habitat that can be effectively sampled in late summer using backpack or towed barge electrofishing gear.

Additional considerations to decide between alternative candidate reaches include:

- Proximity to a stream gage or weather station that can be used to infer flooding or low water events on the reach,

[2] Install additional temperature loggers up to one per reach where there is concern for variable temperature response within a cluster.

[3] While direct angler counts are preferred, vehicle counts may be substituted if visibility precludes direct angler counts. In some locations, it may be difficult to determine whether persons associated with the vehicle are angling, hunting, or otherwise occupied. Agents should decide based on visible observation of gear (example: rod case vs. gun case) and best judgement. When in doubt, vehicles should be considered to belong to anglers. Locations that are particularly ambiguous should be reported to supervisor for troubleshooting.

- Reach includes one or more channel features such as high-quality spawning substrate or waterfalls that are likely to concentrate trout during the sampling period.

Study stream reach selection also considered opportunities to maximize the return on staff time by obtaining supplemental angler use data. Where geographic proximity allows, angler use data on a "cluster" of trout stream reaches beyond the reaches that will be sampled for YOY for this study this data will be collected to provide additional context for the intensity of angler use.

Angling Pressure Estimates:

Angling pressure will be estimated from angler counts on 1 randomly selected weekday and 1 randomly selected weekend day per week (Pollock, Jones, & Brown, 1994) between October 16 and December 15. Based on an analysis of the sample variance of angler counts conducted on Esopus Creek[4] between October 1 and November 30, 2012, the total of 18 sampling days should provide an estimate of angling effort with a 95% confidence interval approximating 40% of the point estimate value (McCormick & Meyer, 2017). Angler counts and angling pressure estimates will be completed as follows:

- Follow 2021 count day schedule and instructions for selecting count start times provided in Appendix 2. A sample count form is also provided. Updated schedules will be provided for 2022 and 2023.
- Complete two count runs per day (Between 9 AM and Sunset[5]) (Pollock, Jones, & Brown, 1994).
- Calculate estimates of angling effort during the sampling period from the angler count data (regional biologists) according to the methods of Pollock, Jones and Brown (1994) and submit to the Coldwater Unit Leader in a standard format to be provided.

The sampling period was selected as the period during which the new catch and release season would be most attractive to anglers in terms of weather and the opportunity to catch large trout during spawning migrations. This period was thus considered to capture the greatest potential for the disruption of trout spawning and disturbance of redds.

[4] Esopus Creek data was used as a proxy due to its extended fishing season under special regulation and because its trout fishery draws heavy participation from the NYC metropolitan area (Alexiades, Marcy-Quay, Sullivan, & Kraft, 2014). Creel data from 2011 was not used due to the disruption of the fishery due to Hurricane Irene.

[5] Recent creel survey data from Esopus Creek 2012 and Cattaraugus Creek 2019 document negligible angling activity prior to 9 AM during the fall period (Figure 1).

YOY Relative Abundance Estimates:

At least 2 YOY survey sites (minimum length 300 feet) were established for each study reach (Appendix 1). YOY survey sites were selected to represent high-quality spawning and nursery habitat (stable channel, abundant gravel substrate, emergent vegetation) (McRae & Diana, 2005). YOY trout will be sampled by electrofishing as follows:

- Sample once annually in late August or early September beginning in 2021.
- Complete at least 2 electrofishing passes (depletion)[6], collecting trout only. Crew instructed to target YOY size trout (<125mm). No blocker seine used (McRae & Diana, 2005).
- Count all trout; measure a sample of at least 25 YOY and all yearling or older trout to the nearest millimeter and return to water after final pass.[7]
- Determine YOY status based on sample length-frequency
- Complete a SC (Site Characteristics) form for each electrofishing site. All CROTS fields must be completed to facilitate comparison with historic data.
- Estimate YOY abundance from survey data (regional biologists) and report as site-specific CPUE and site-specific population estimate (Binomial Depletion Model). Submit estimates to the Coldwater Unit Leader in a standard format to be provided.

YOY abundance during the study will be compared to YOY abundance data for habitats of comparable quality based on SITE CHARACTERISTICS data in the Statewide Fisheries Database. Because flood events have been shown to heavily influence brown trout survival to YOY (August) (Lobon-Cervia, 2009), the best available source(s) of relevant precipitation and/or stream discharge data will be identified for each reach and used to provide additional context for the results. In addition, temperature loggers will be installed to collect hourly thalweg water temperatures from June 1 through the date of the electrofishing survey to verify thermal regime.

Study Schedule

2021

- June 1: Study stream reach selections finalized following input from TSMP Focus Group representatives,

- June 11: Thermographs in place,

[6] A third pass is necessary if the number of YOY captured on the second pass is not substantially less than on the first pass or if the biologist suspects that either of the first two passes caught less than 20% of the total YOY present. **When in doubt, a third pass should be completed** given the innate tendency to capture larger trout on the first pass.

[7] While YOY are the focus of this study, obtaining size and abundance data for yearling and older trout provides additional context for comparisons with historical data.

- August 15 - September 15: YOY habitat sampled by electrofishing; thermographs removed,

- October 16 - December 15: 18 days of pressure surveys completed (9 weekend count days and 9 weekday count days),

- December 30: 2021 data received by Coldwater Unit Leader.

2022

- January 31: 2021 data summarized by Coldwater Unit Leader, any potential changes to study methods identified for consideration,

- February 28: Decision reached on any study method changes under consideration,

- June 11: Thermographs in place,

- August 15 - September 15: YOY habitat sampled by electrofishing; thermographs removed,

- October 16 - December 15: 18 days of pressure surveys completed (9 weekend count days and 9 weekday count days),

- December 30: 2021 data received by Coldwater Unit Leader.

2023

- January 31: 2022 data summarized by Coldwater Unit Leader,

- June 11: Thermographs in place,

- August 15 - September 15: YOY habitat sampled by electrofishing; thermographs removed,

- October 16 – December 15: 18 days of pressure surveys completed (9 weekend count days and 9 weekday count days),

- December 30: 2022 data received by Coldwater Unit Leader.

2024

- January 31: 2023 data summarized by Coldwater Unit Leader,

- June 11: Thermographs in place,
- August 15 – September 15: YOY habitat sampled by electrofishing; thermographs removed,

- December 30: 2023 data received by Coldwater Unit Leader.

2025

- January 31: Draft comprehensive Report completed by Coldwater Unit Leader

Literature Cited

Alexiades, A., Marcy-Quay, B., Sullivan, P., & Kraft, C. (2014). *Evaluation of the NYSDEC catch rate oriented trout stocking program: Project Report.* Ithaca: Cornell University.

Lobon-Cervia, J. (2009). Why, when and how do fish populations decline, collapse and recover? The example of brown trout (Salmo trutta) in Rio Chaballos (northwestern Spain). *Freshwater Biology*, 1149-1162.

McCormick, J., & Meyer, K. (2017). Sample Size Estimation for On-Site Creel Surveys. *North American Journal of Fisheries Management*, 37: 970-980.

McRae, B. J., & Diana, J. S. (2005). Factors Influencing Density of Age-0 Brown Trout and Brook Trout in the Au Sable River, Michigan. *Transactions of the American Fisheries Society*, 132-140.

NYSDEC. (2020). *New York State Trout Stream Management Plan.* Albany: New York State Department of Environmental Conservation.

Pollock, K., Jones, C., & Brown, T. (1994). *Angler Survey Methods and Their Applications in Fisheries Management.* Bethesda: American Fisheries Society.

Smith, C. L. (1985). *The Inland Fishes of New York State.* Albany: New York State Department of Environmental Conservation.

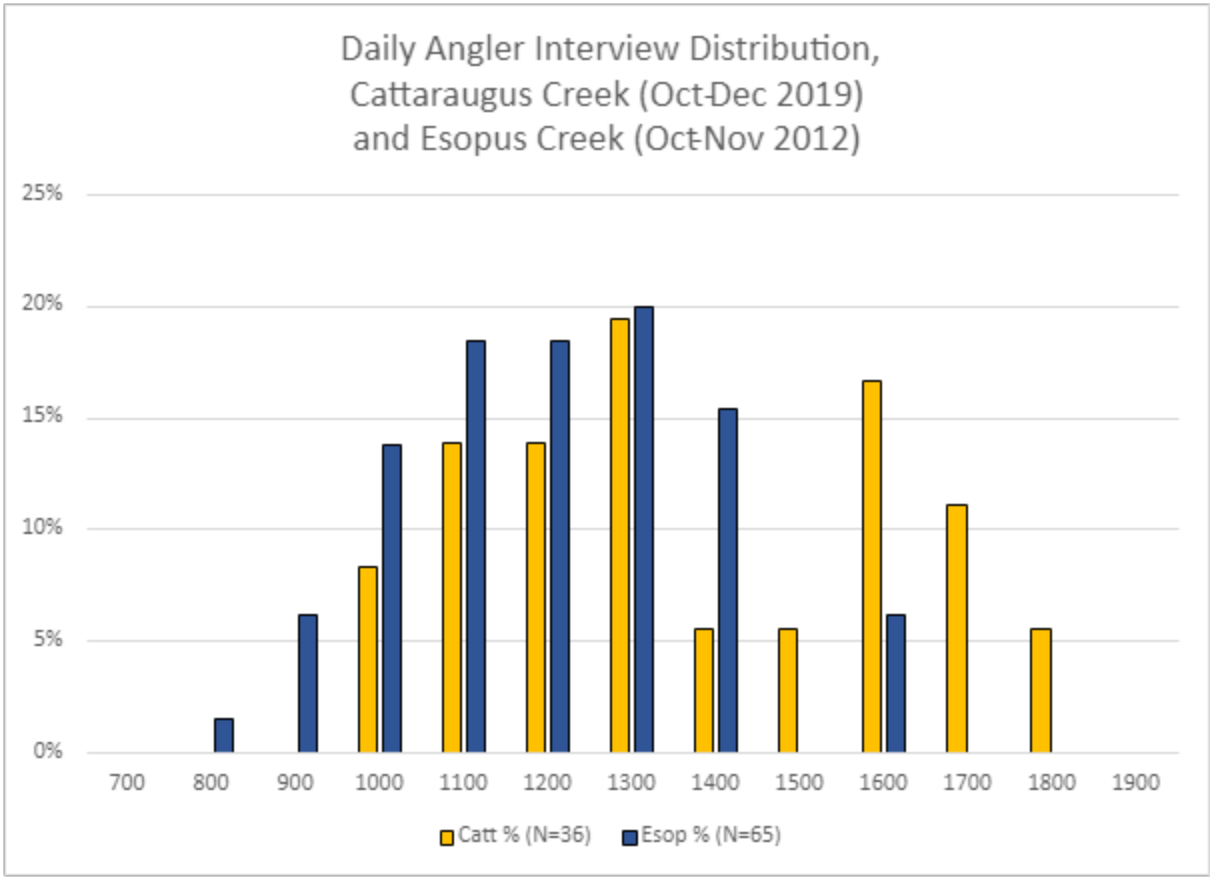


Figure 1 Distribution of Angler Interviews by Hour of the Day

Appendix One: Study Reaches and Supplemental Angler Count Reaches

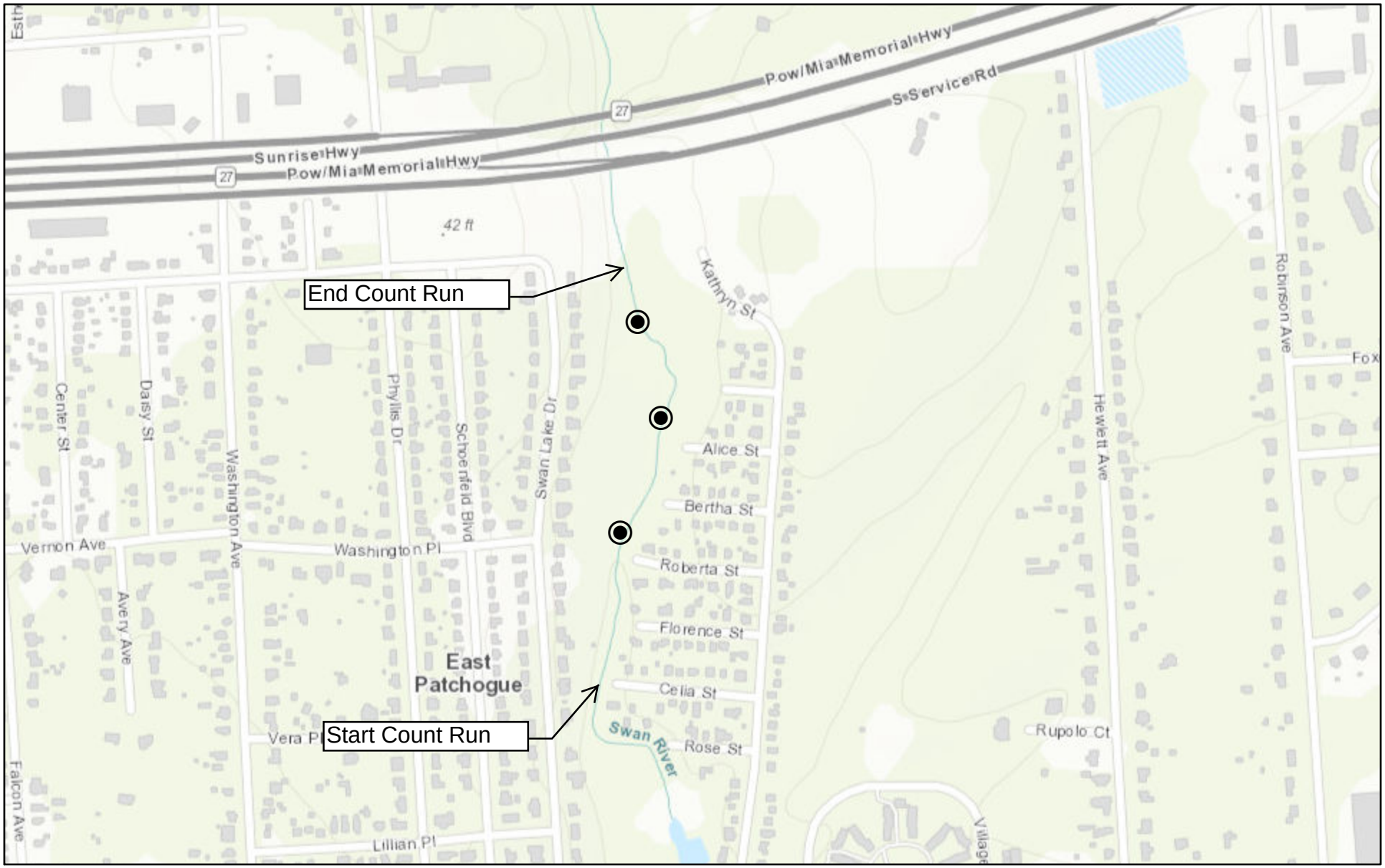
The sample for this study comprises 19 trout stream study reaches (5 *Wild*, 9 *Wild-Quality*, and 5 *Wild-Premier*). These stream reaches are listed by region below and organized into 10 clusters (driving routes) for counting anglers. In addition to the 19 study reaches, 6 supplemental angler count reaches are included in the clusters for the purpose of obtaining additional angler use estimates. YOY surveys will not be conducted in these supplemental angler count reaches.

Region One:

Swan River (Wild)

- Reach description: From Celia St. upstream to 300 feet North of Kathryn Street
- Estimate of time required to complete a count run: 45 minutes
- Count method: Anglers
- YOY survey sites: 3 sites as shown on map

Swan River



June 30, 2021

◉ Young of Year Sampling Site

1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

Not a legal document

Region Three:

Three independent stream reach clusters or routes are proposed as follows.

East of Hudson Route

- Reach descriptions:
  - **West Branch Outlet (West Branch Outlet) (*Wild-Quality*)** - Start at Rt 6 Bridge just below West Branch Reservoir stopping at West Shore Dr. Bridge at the confluence of Croton Falls Reservoir.
  - **Muscoot River (Amawalk Outlet) (*Wild-Quality*)** – Start at Wood St Bridge above Muscoot Reservoir stopping at Route 35 Bridge just below Amawalk Reservoir.
- Estimate of time required to complete a count run : 1.5 hours (includes both sections)
- Count method: Anglers
- YOY survey sites: 4 sampling locations shown (2 per stream).

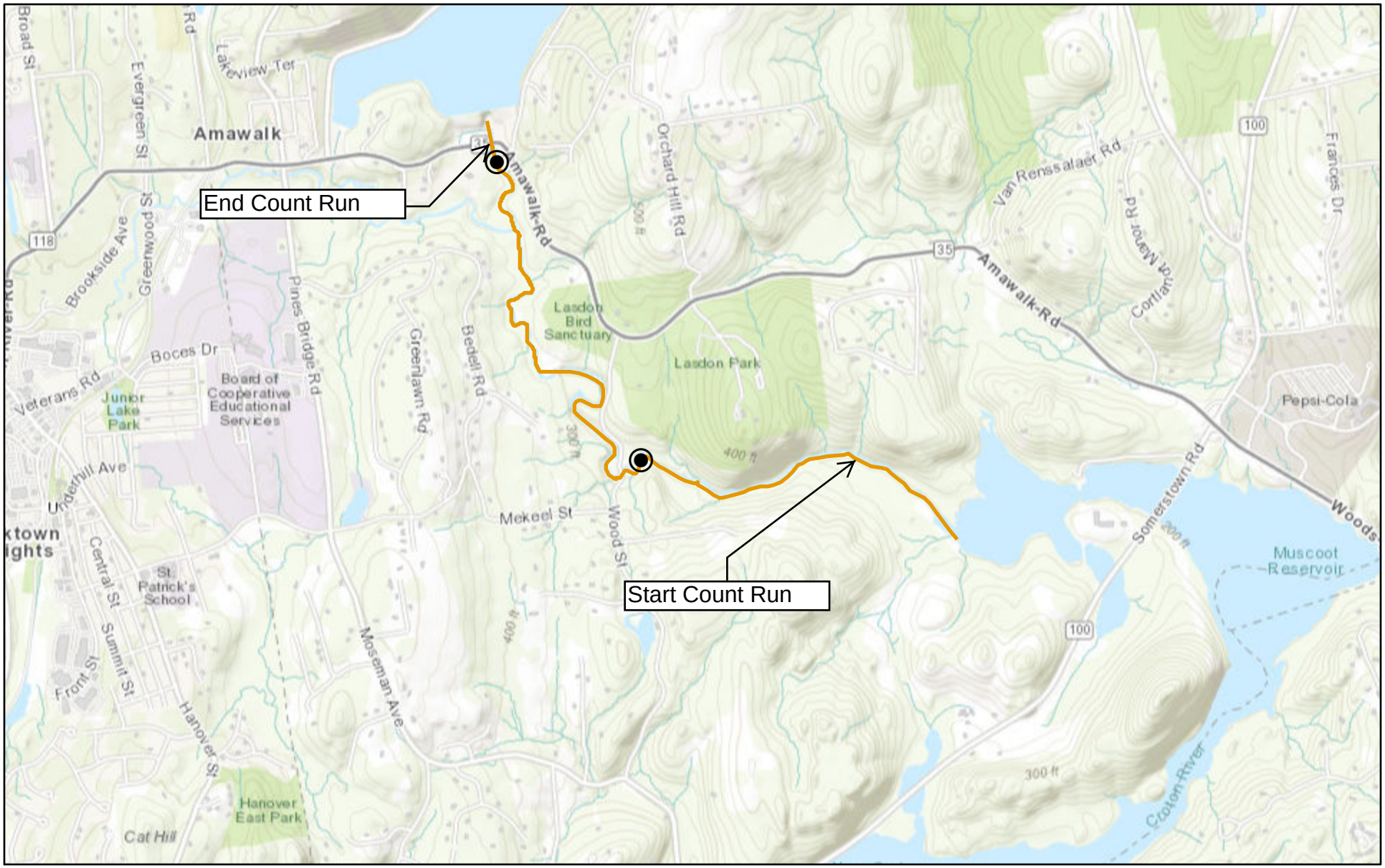
Esopus and Tributaries Route

- Reach Descriptions:
  - **Esopus Creek (*Wild-Quality*)** (blue reach on map): Shandaken Portal near Allaben, NY upstream to Lost Clove Road bridge near Big Indian, NY
  - **Esopus Creek (*Wild-Quality*)** (blue reach on map): From Chimney Hole near Boiceville, NY upstream to Shandaken Portal near Allaben, NY (Supplemental angler count reach only)
  - **Woodland Creek (*Wild*)** (orange reach on map): Confluence with Esopus Creek upstream to the upstream end of the DEC Primitive Campground
  - **Fox Hollow Creek (*Wild*)** (green reach on map): Confluence with Esopus Creek upstream to the end of Fox Hollow Road
- Estimate of time required to complete a count run: 2 hours 45 minutes (includes Esopus & Tributaries)
- Counting method: Anglers
- YOY survey sites: 6 sampling locations shown on the map (2 per stream).

Mongaup Creek (*Wild-Quality*)

- Reach description: Mongaup Creek from the downstream end of public access upstream to the angler parking area across from the DEC Camp DeBruce
- Estimate of time required to complete a count run: 15 minutes
- Counting Method: Anglers (counts to be completed by Catskill Hatchery Staff)
- YOY survey sites: 2 sampling locations shown on the map.

Muscoot River (Amawalk Outlet)



June 30, 2021

1:36,112

0 0.23 0.45 0.9 mi

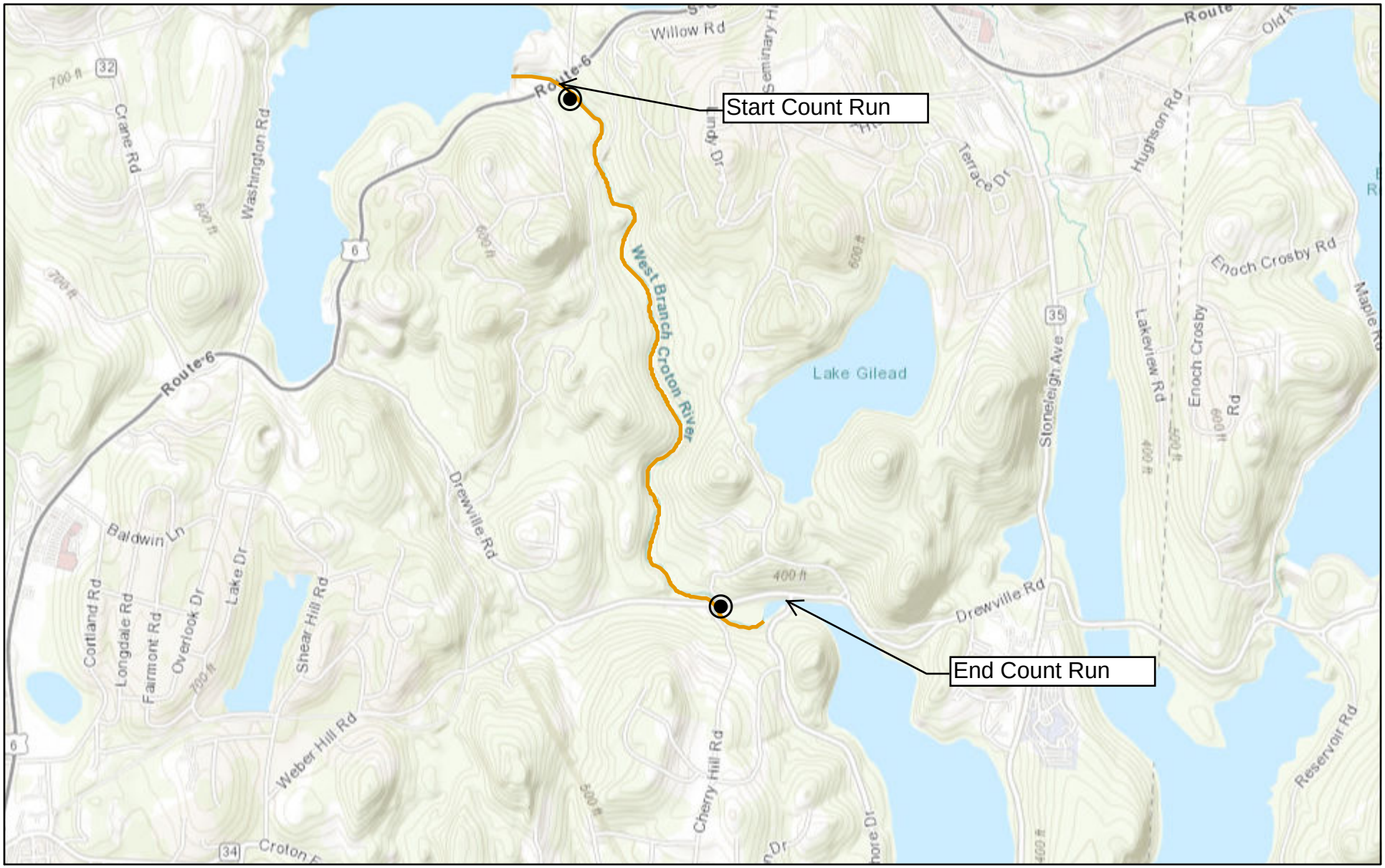
0 0.35 0.7 1.4 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

Not a legal document

West Branch Croton River (West Branch Outlet)



June 30, 2021

◉ Young of Year Sampling Site

1:36,112

0 0.23 0.45 0.9 mi

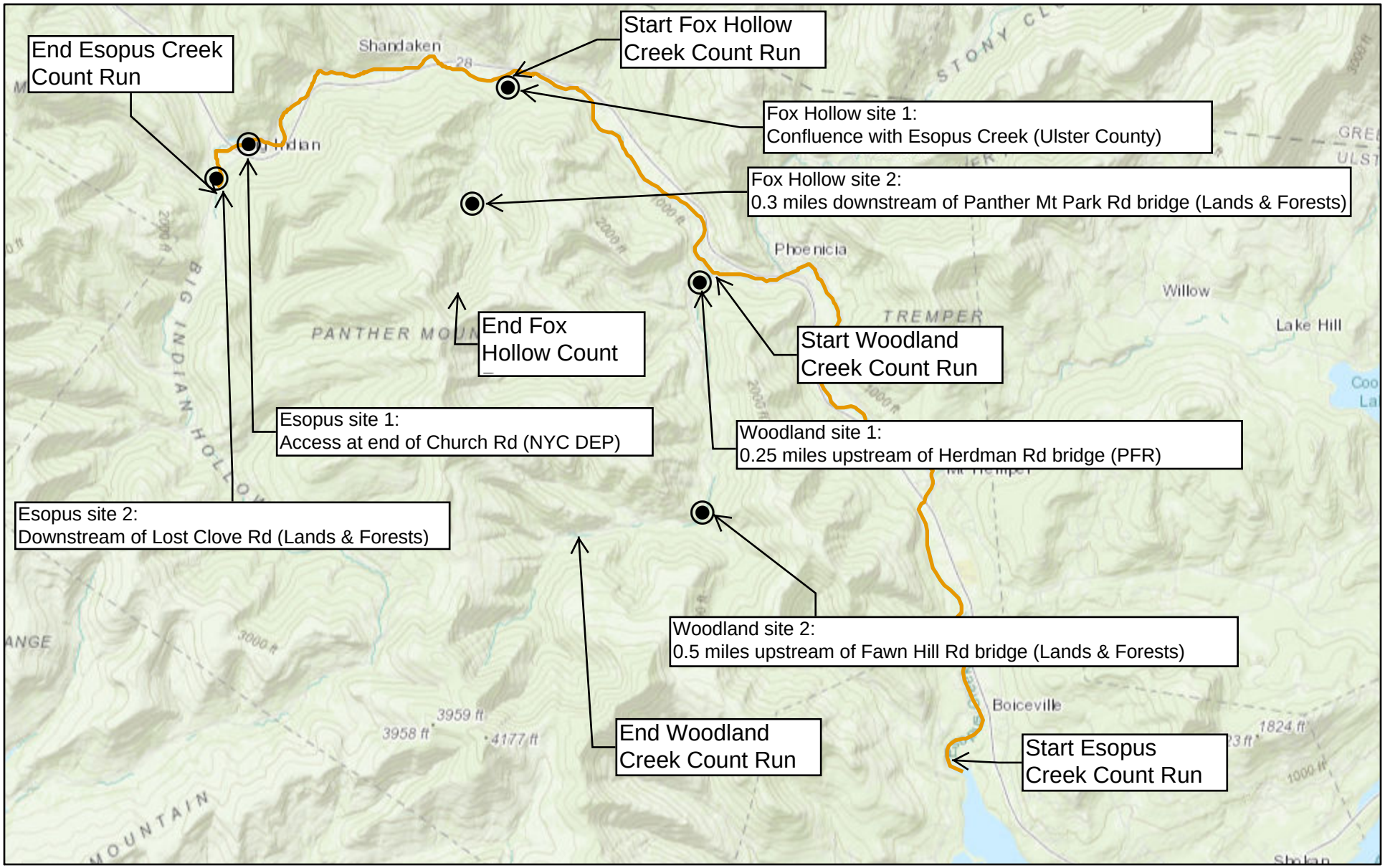
0 0.35 0.7 1.4 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

Not a legal document

Esopus and Tributaries



June 30, 2021

◉ Young of Year Sampling Site

1:144,448

0 0.75 1.5 3 mi

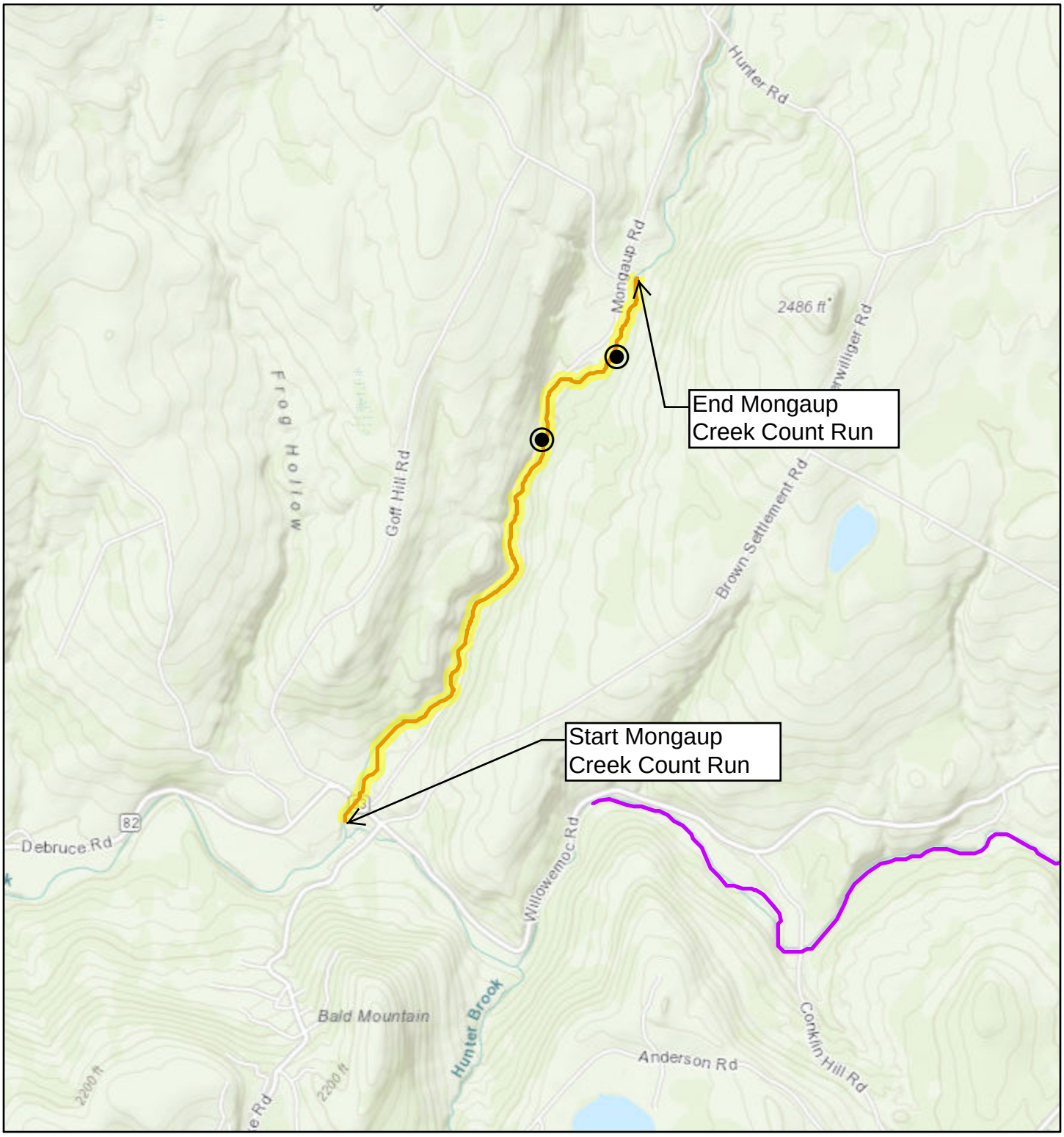
0 1.5 3 6 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

Not a legal document

Mongaup Creek



July 12, 2021

◉ Young of Year Sampling Site

1:36,112

0 0.23 0.45 0.9 mi

0 0.35 0.7 1.4 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Author: Craig Rockwell

Not a legal document

Region Four:

West Branch Delaware River (*Wild-Premier*)

- Reach description: From weir in Stilesville downstream to NY/PA border some 2.0 miles downstream of the Hale Eddy Bridge
- Estimate of time required to complete a count run: 30 minutes (reach length 9 miles)
- Counting method: Anglers
- YOY survey sites:
  - Site #1: Deposit Bridge
  - Site #2: Men's Club
  - Site #3: Airport Road

East Branch Delaware River (*Wild-Premier*)

- Reach description: from Shinhopple Bridge upstream to Downsville Covered Bridge
- Estimate of time required to complete a count run: 15 minutes (reach length ~7 miles)
- Counting method: Anglers
- YOY survey sites:
  - Site #1: Corbet Bridge
  - Site #2: Mattson Farm
  - Site #3: Shinhopple Bridge

Bush Kill (*Wild-Quality*)

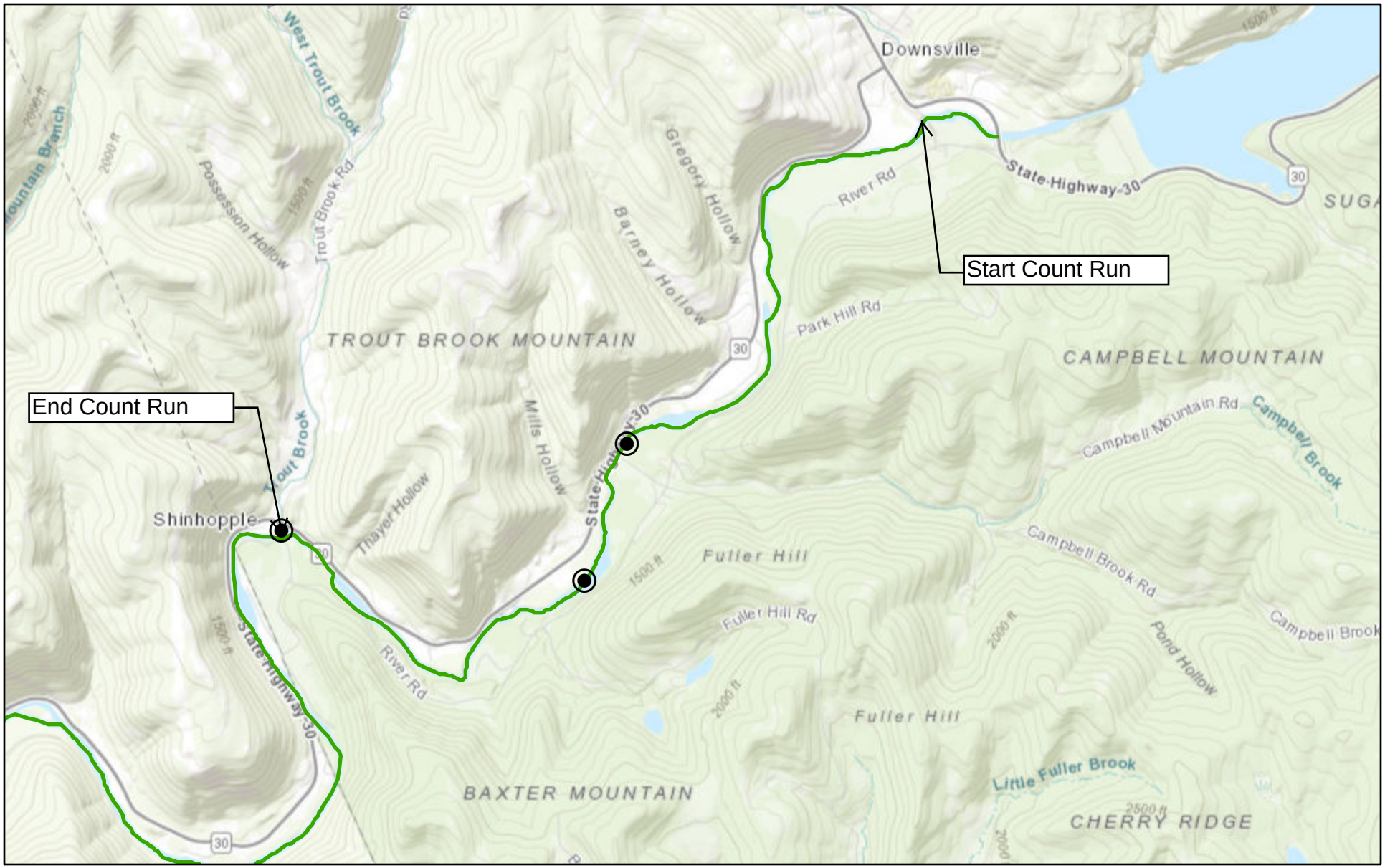
- Reach description: From Dry Brook at Arville Town Park upstream to confluence of Vly Creek and Emory Brook in Fleischmann
- Estimate of time required to complete a count run: 15 minutes (reach length ~5 miles)
- Counting method: Anglers
- YOY survey sites:
  - Site #1: Fleischmann's Park
  - Site #2: PFR near Kleis Rd
  - Site #3: Arkville Park

Drive time between reaches

- Weir (West Branch Delaware River) to Downsville (East Branch Delaware River): 42 minutes
- Weir (West Branch Delaware River) to Fleischman's (Bush Kill): 83 minutes

It would be cutting it close, but all three count runs could be completed in roughly 3 hours. Ideally one staff member should count anglers on the Bush Kill and another staff member for EBDR and WBDR.

East Branch Delaware River



June 30, 2021

◉ Young of Year Sampling Site

1:72,224

0 0.45 0.9 1.8 mi

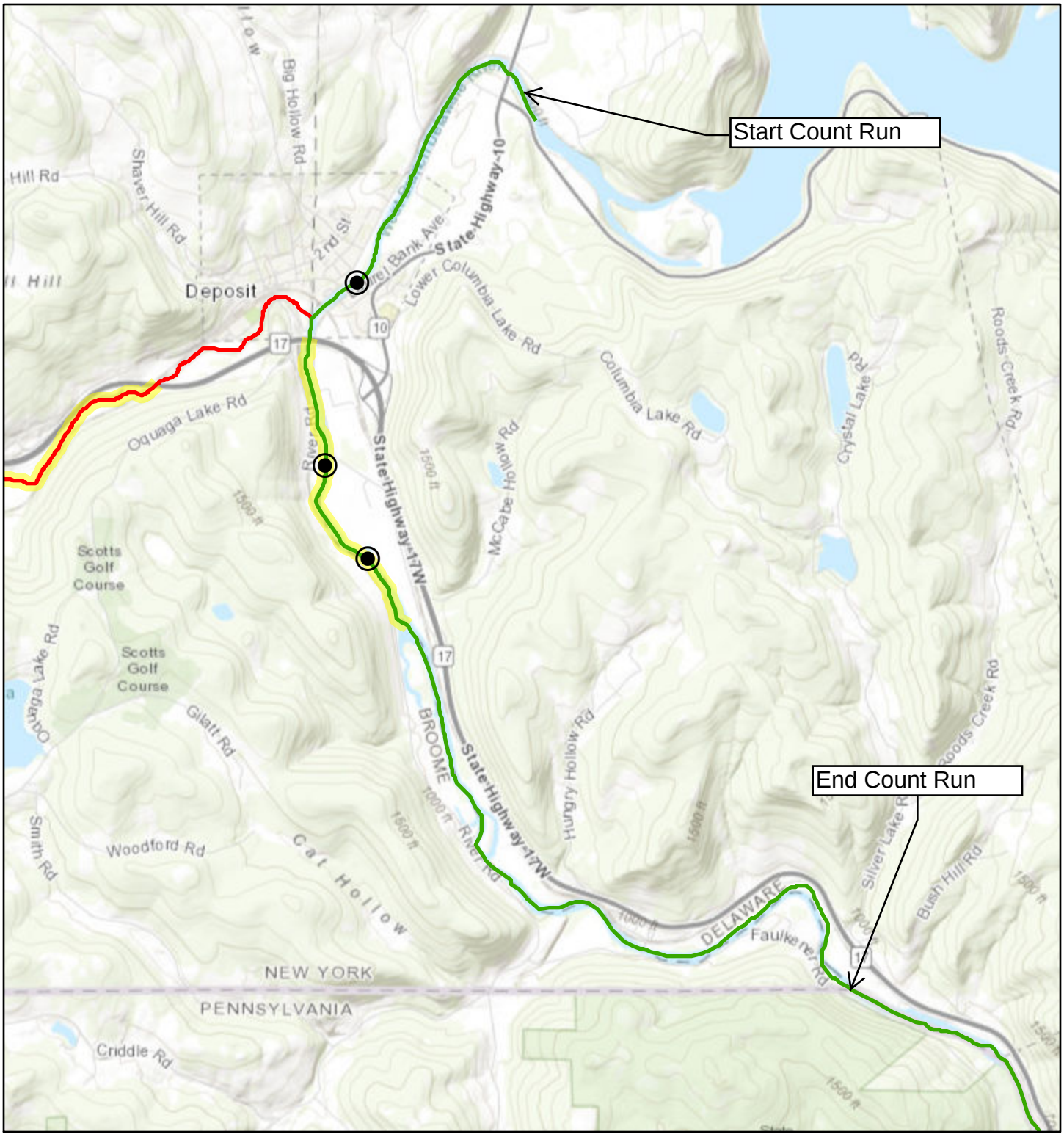
0 0.75 1.5 3 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

Not a legal document

West Branch Delaware River



June 30, 2021

◉ Young of Year Sampling Site

1:72,224

0 0.45 0.9 1.8 mi

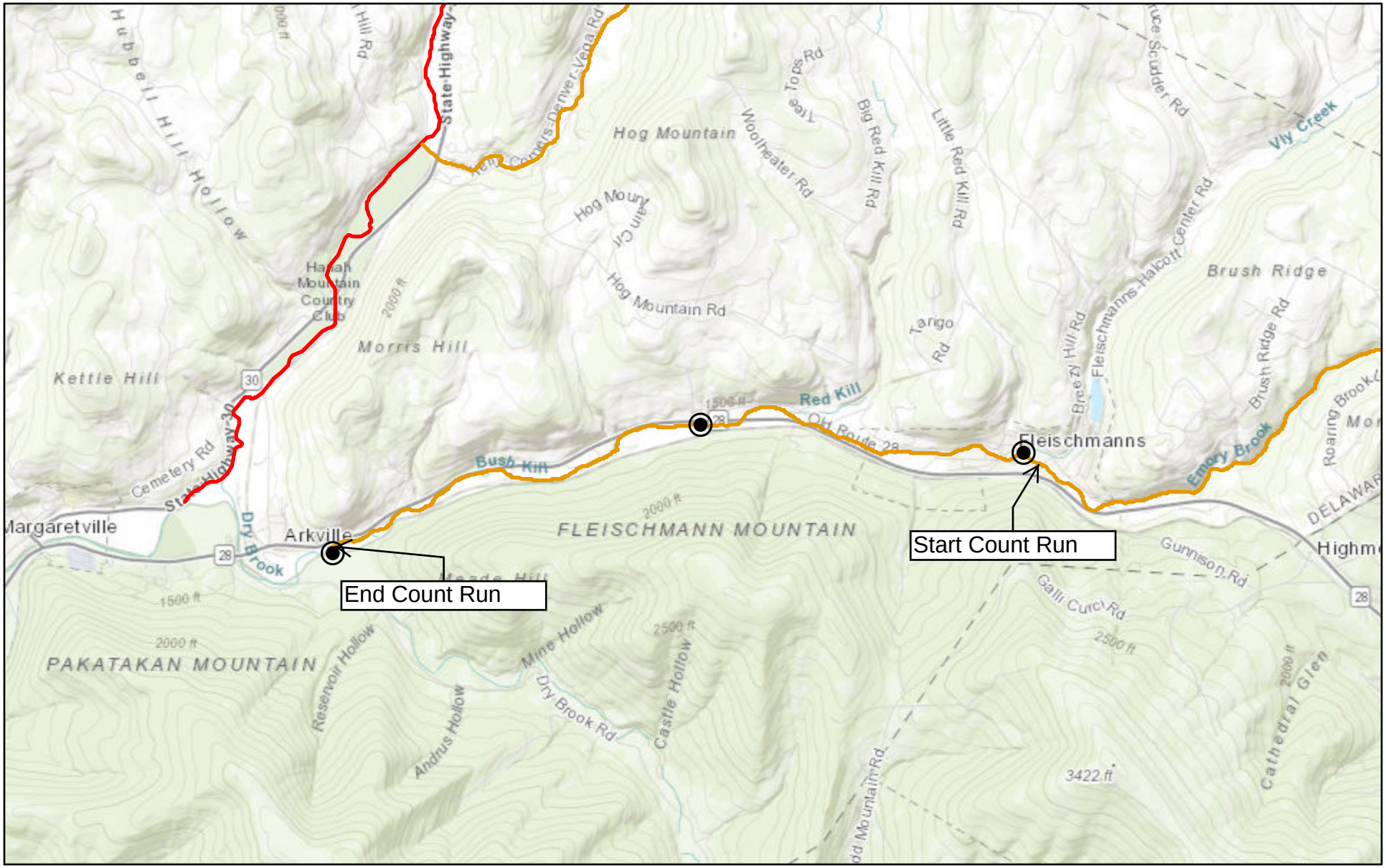
0 0.75 1.5 3 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Author: Craig Rockwell

Not a legal document

Bush Kill



June 30, 2021

◉ Young of Year Sampling Site

1:72,224

0 0.45 0.9 1.8 mi

0 0.75 1.5 3 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

Not a legal document

Region Five:

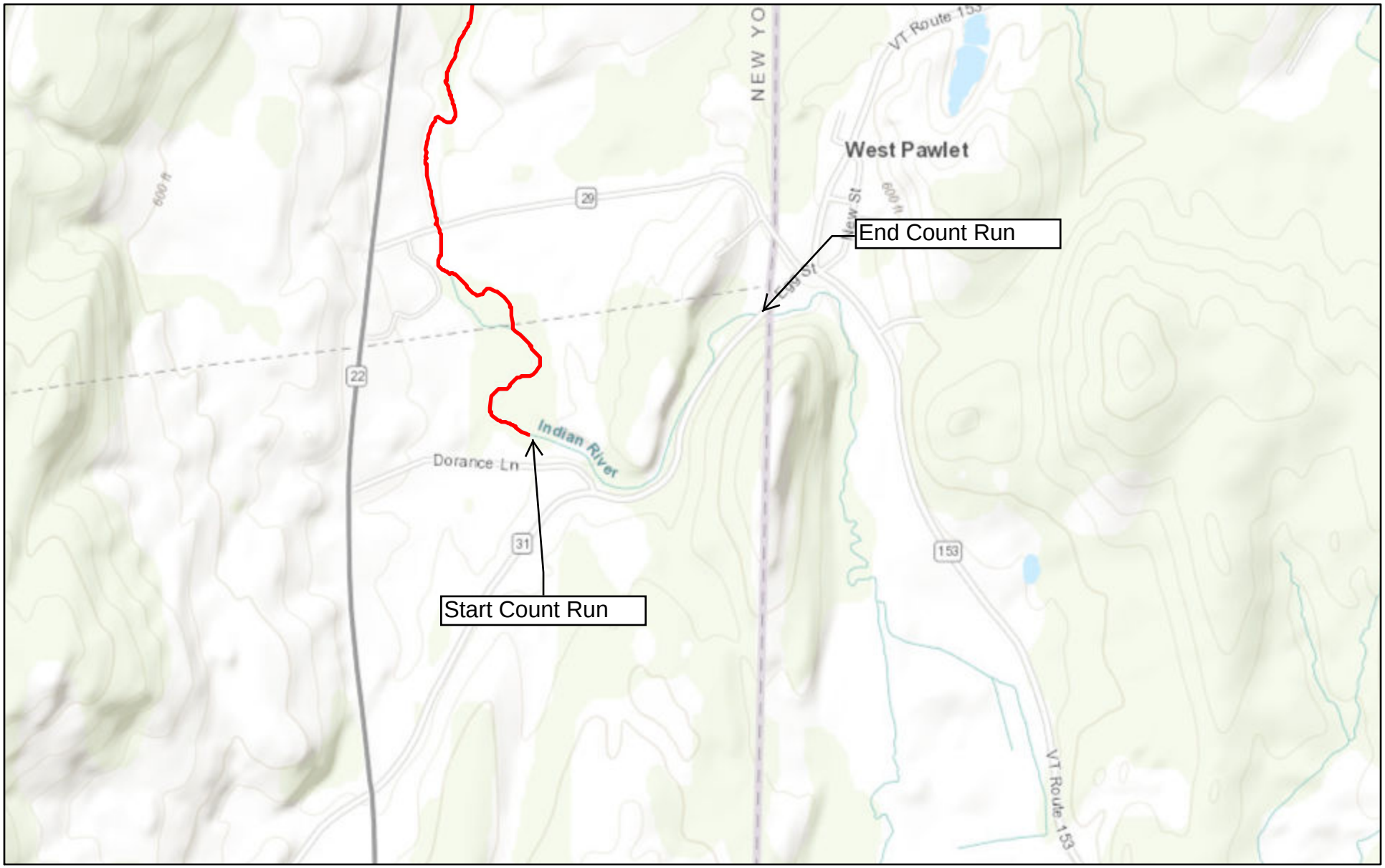
Indian River (*Wild*)

- Reach description: Wild section of PFR along Co. Route 31 to VT state line
- Estimate of time required to complete a count run: 20 mins
- Counting method: Anglers
- YOY survey sites: 2 sites within mapped reach, precise locations to be determined

Camden Creek (*Wild*)

- Reach description: Wild section with PFR- one parking area on Camden Valley Road-
- Estimate of time required to complete a count run: 20 mins
- Counting method: Anglers
- YOY survey sites: 2 sites within mapped reach, precise locations to be determined

Indian River



June 30, 2021

1:18,056

0 0.1 0.2 0.4 mi

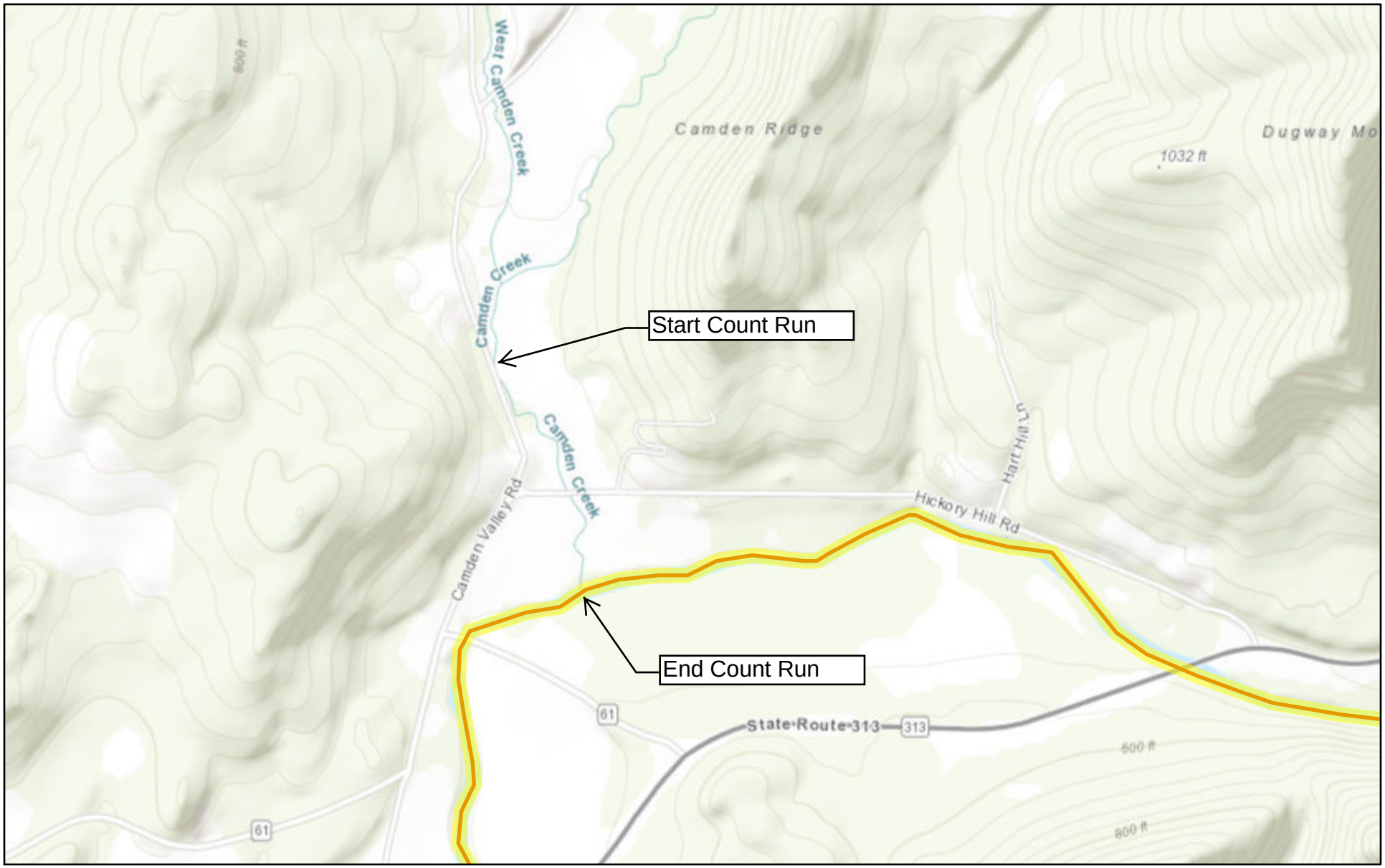
0 0.17 0.35 0.7 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

Not a legal document

Camden Creek



June 30, 2021

1:18,056

0 0.1 0.2 0.4 mi

0 0.17 0.35 0.7 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

Not a legal document

Region Six:

Crystal Creek (*Wild-Quality*)

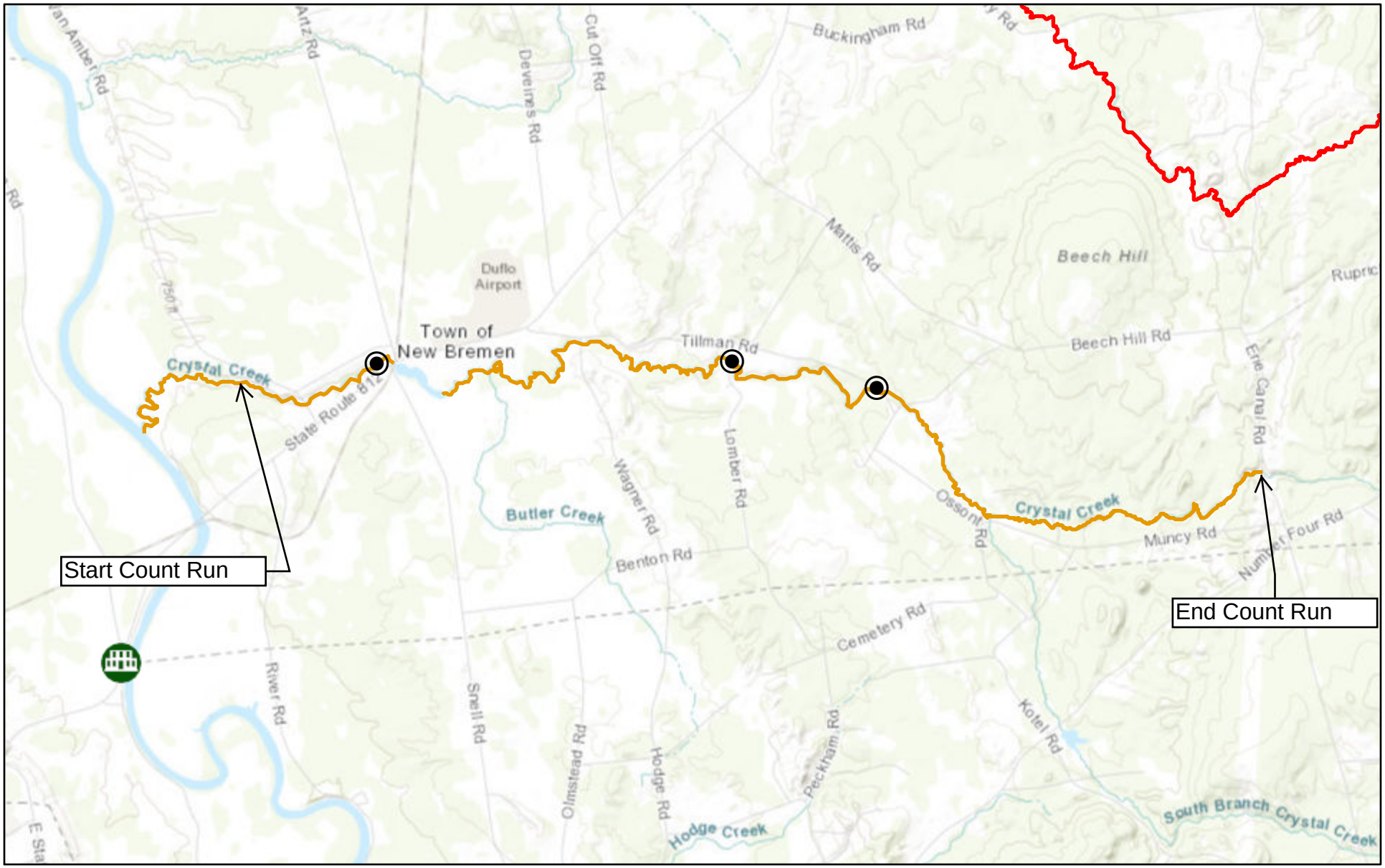
- Reach description: from Confluence with Black River to Erie Canal Road
- Estimate of time required to complete a count run: 15 minutes
- Counting method: Anglers
- YOY survey sites:
    - just downstream of Crystal Pond Dam
    - Lomber Rd FPA
    - Tillman Rd FPA

Fish Creek (Tributary of Black River) (*Wild*)

- Reach description: From Confluence with Black River to North South Rd
- Estimate of time required to complete a count run: 15 Mins
- Counting Method: Anglers
- YOY Survey Sites:
    - FPA on Jones Road
    - Downstream of Singing Waters Campground
    - Upstream of Singing Waters Campground

Travel between streams 30 Mins

Crystal Creek



July 21, 2021

◉ Young of Year Sampling Site

1:72,224

0 0.45 0.9 1.8 mi

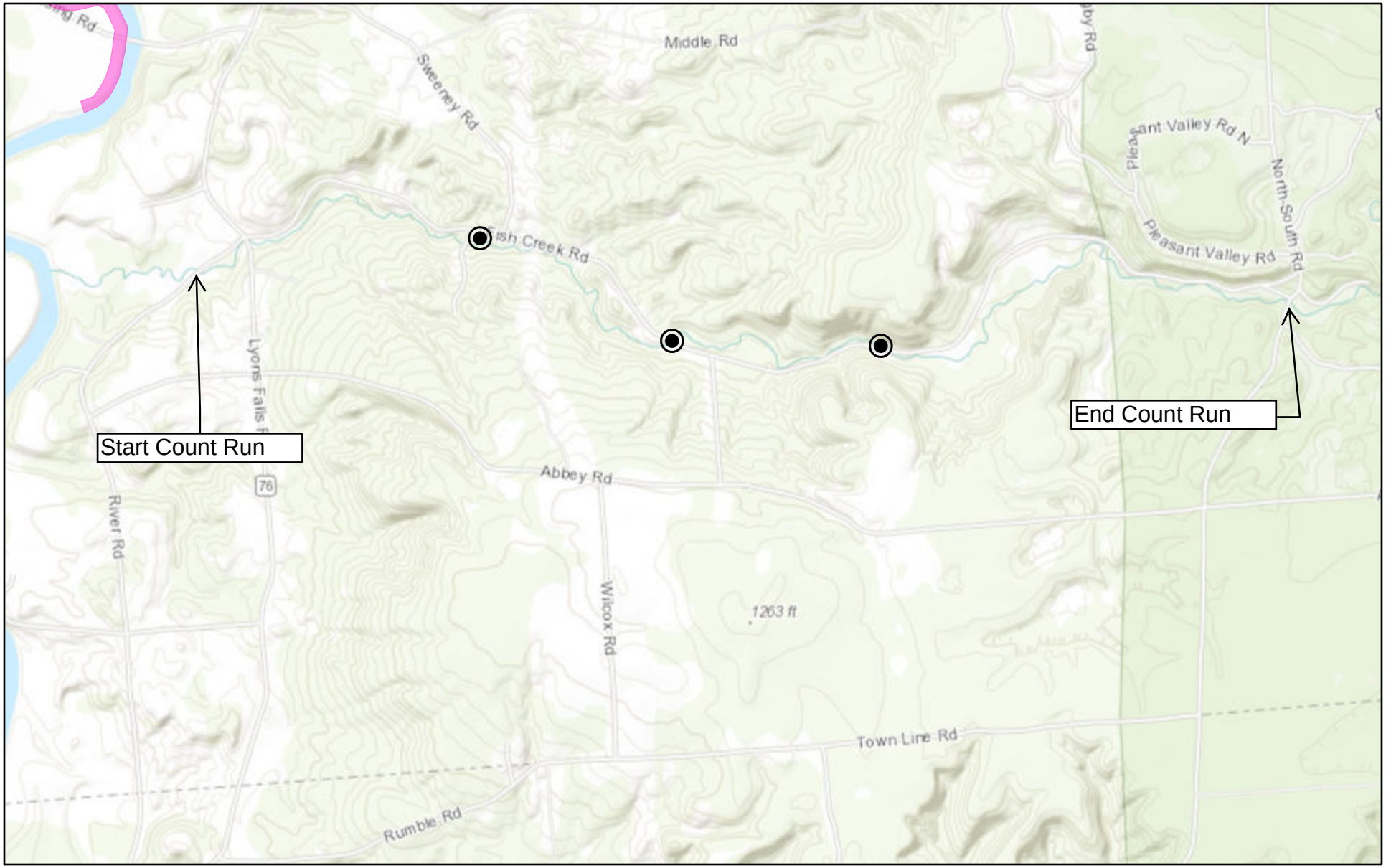
0 0.5 1 2 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

Not a legal document

Fish Creek



June 30, 2021

◉ Young of Year Sampling Site

1:36,112

0 0.23 0.45 0.9 mi

0 0.35 0.7 1.4 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

Not a legal document

Region Seven:

(Old) Chenango Canal (*Wild-Premier*)

- Reach description: From Route 20 to its confluence with Oriskany Creek (see map).
- Estimate of time required to complete a count run: approximately 5 minutes
- Counting method: Car count.
- YOY Survey Sites:
    - Site 1 at bridge on Elm Street
    - Site 2 along Canal Road (see map)

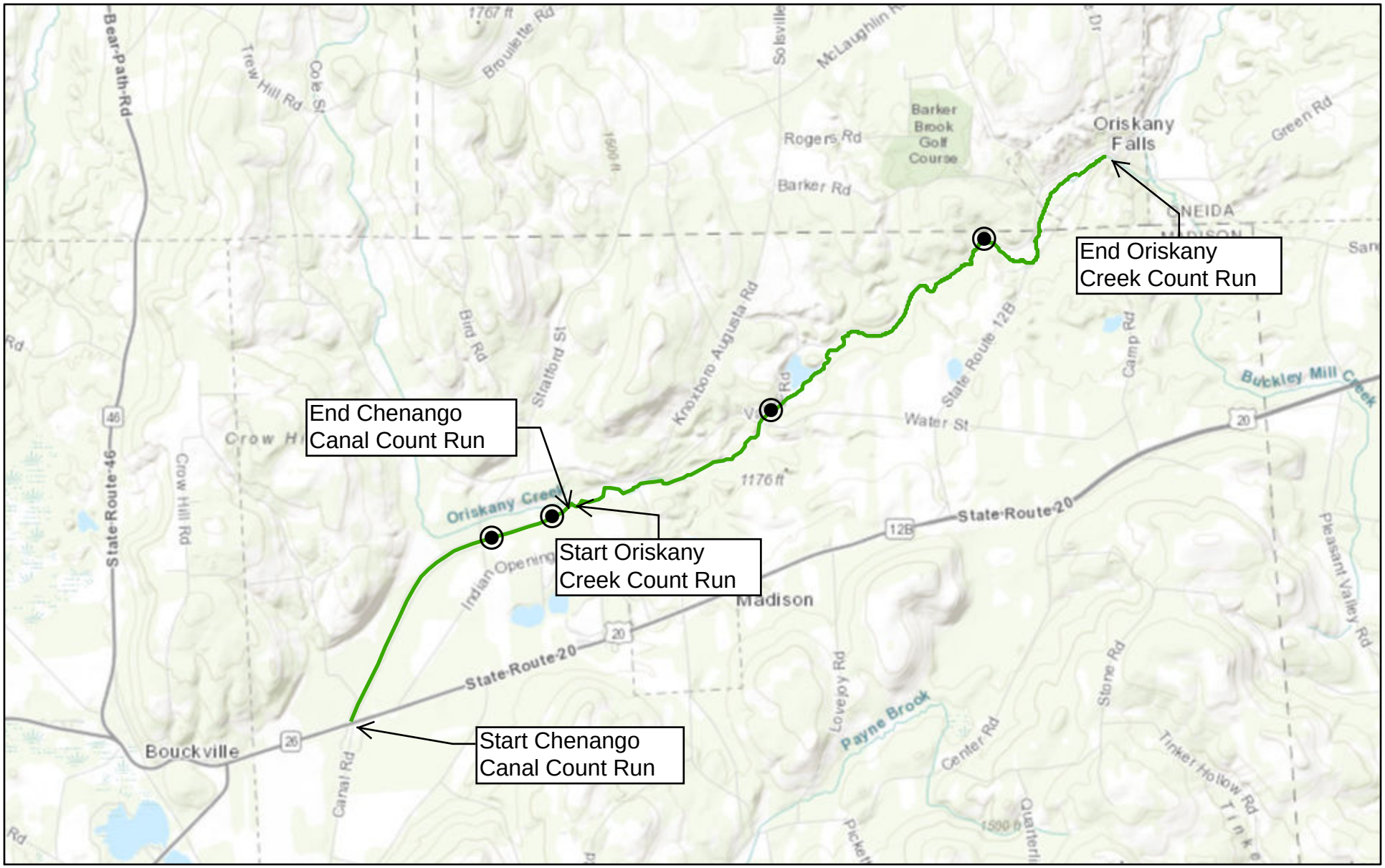
Oriskany Creek (*Wild-Premier*)

- Reach description: From Chenango Canal to Route 12B Bridge in Oriskany Falls (see map).
- Estimate of time required to complete a count run: approximately 15 minutes
- Counting method: Car count
- YOY Survey Sites:
    - Site 1 off Valley Road downstream of Water Street bridge
    - Site 2 off Valley Road near water works (see map).

Big Creek (*Wild*)

- Reach description: Route 315 in Waterville to California Road. This reach is in DEC Region 6. However, proximity to the above study reaches allows Region 7 staff to efficiently obtain supplemental angler use data on this tributary to Oriskany Creek.
- Estimate of time required to complete a count run: approximately 20 minutes
- Counting Method: Car count.
- No YOY survey sites. Supplemental angler use data only.

Old Chenango Canal and Oriskany Creek



July 1, 2021

◉ Young of Year Sampling Site

1:72,224

0 0.45 0.9 1.8 mi

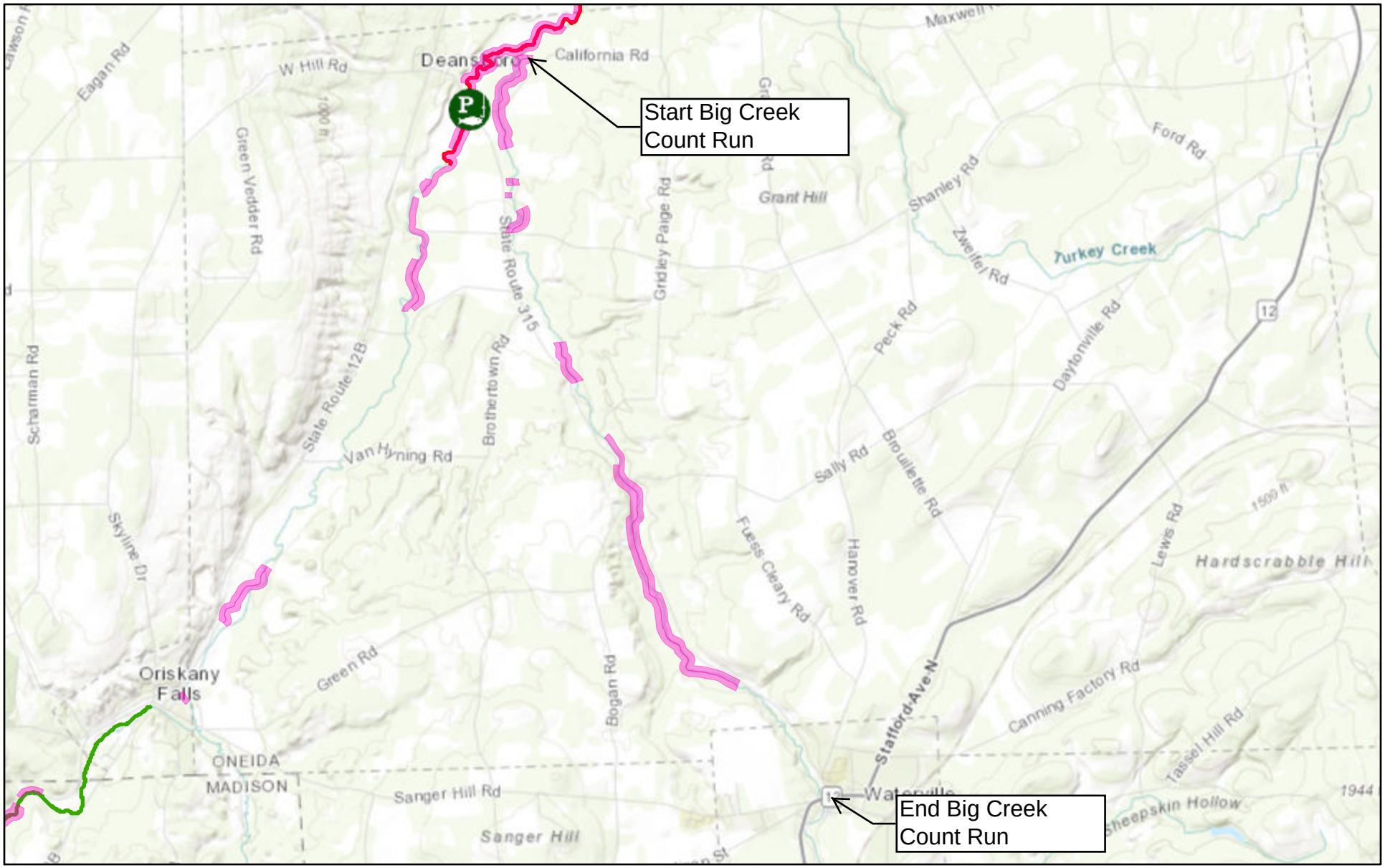
0 0.5 1 2 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

Not a legal document

Big Creek



July 21, 2021

1:72,224

0 0.45 0.9 1.8 mi

0 0.5 1 2 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

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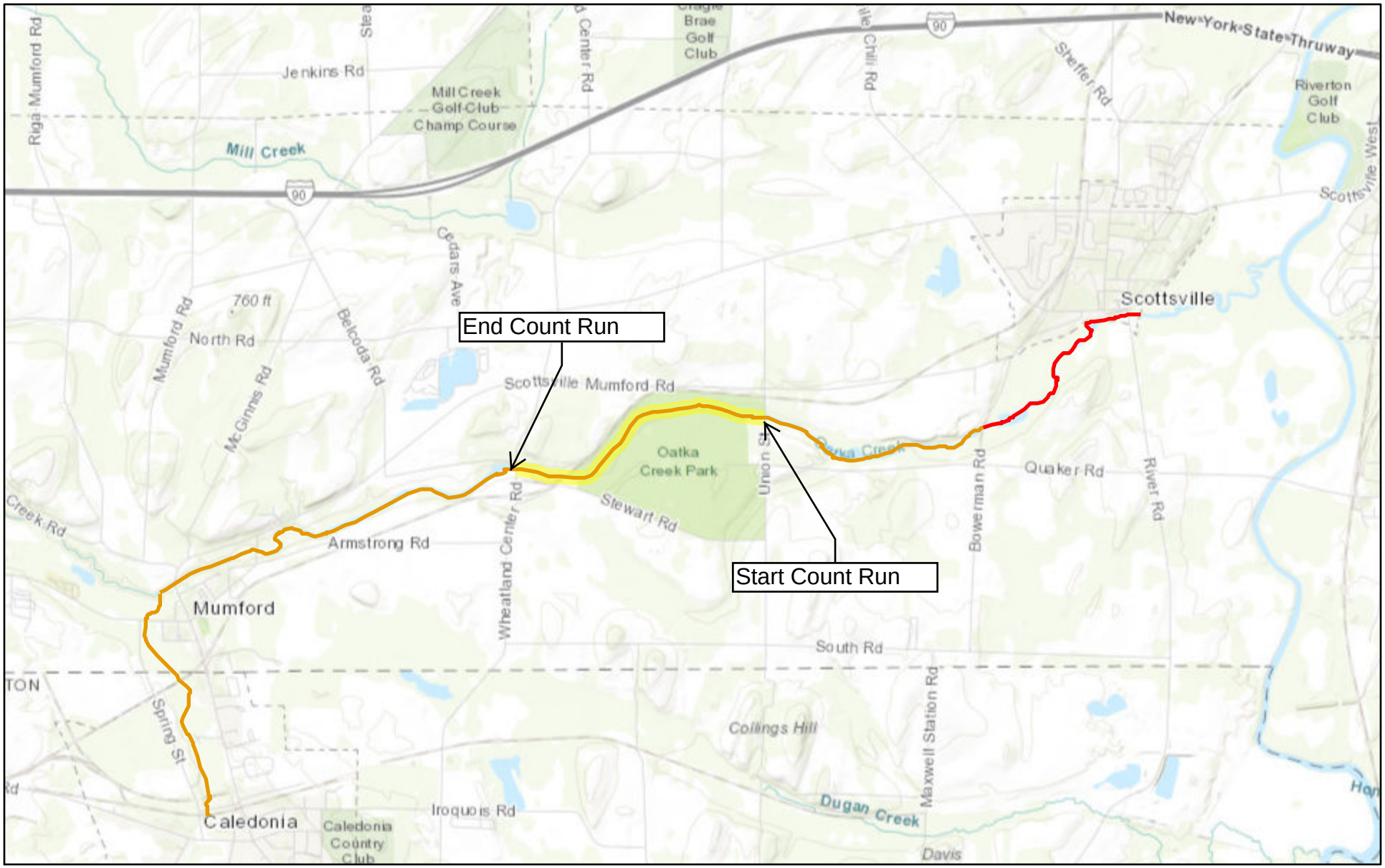
Region Eight:

Oatka Creek (*Wild-Quality*)

- Reach description: Union Street upstream to Wheatland Center Road. Public access via Monroe County Oatka Creek Park.
- Special Regulation: Grandfathered year-round no kill. In place since October 1, 2000.
- Estimate of time required to complete a count run: approximately 30 minutes
- Count method: Count vehicles and anglers (Three potential lots, trail along the creek, and two bridges). See attached map.
- YOY survey sites: 3 sampling sites between Union Street and Wheatland Center Road, precise locations to be determined.

Oatka Creek



July 1, 2021

1:72,224

0 0.45 0.9 1.8 mi

0 0.5 1 2 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

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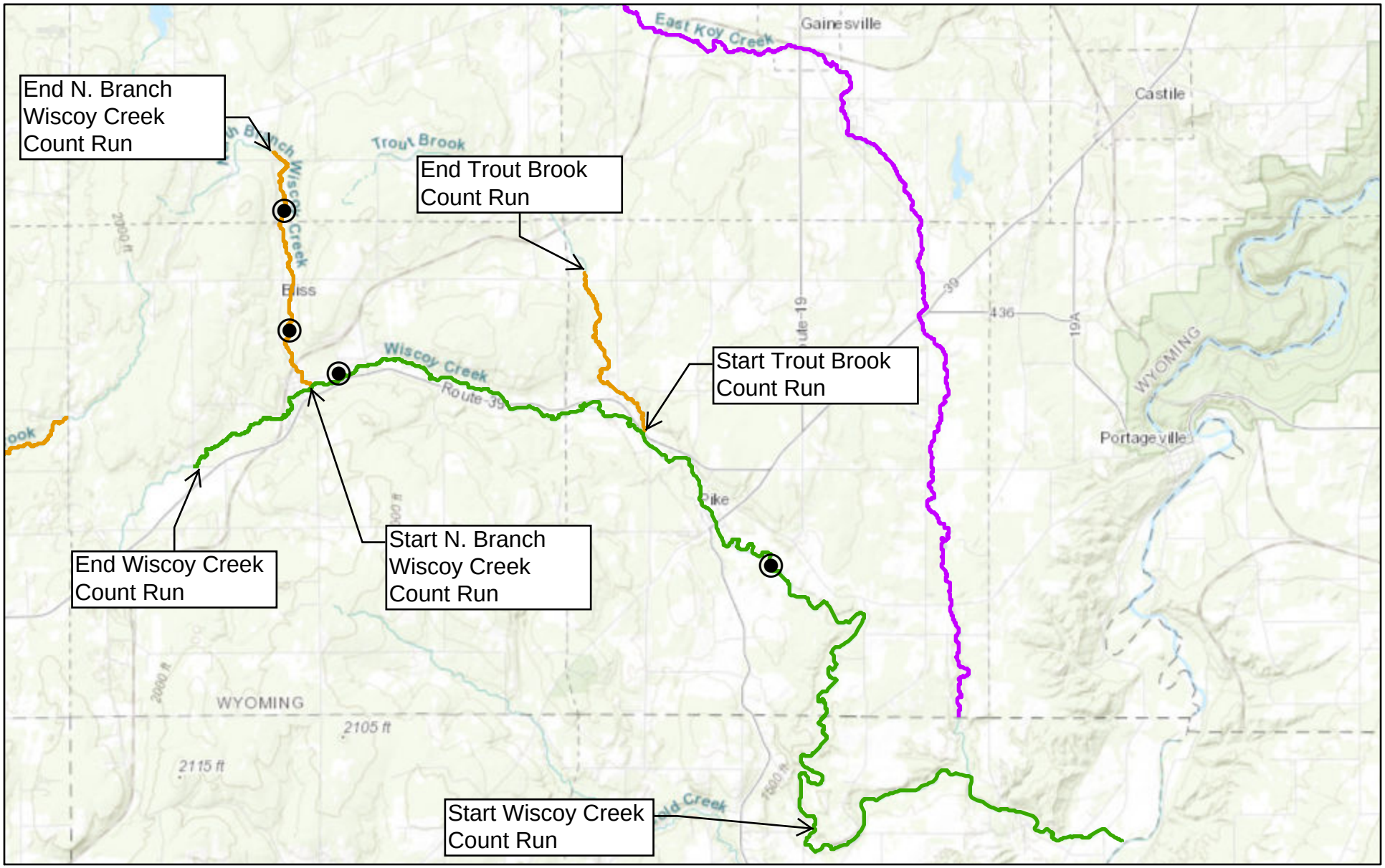
Region Nine:

- Reach descriptions:
  - Full study reaches (angler counts and YOY surveys)
    - **Wiscoy Creek (*Wild-Premier*)** from Pond Road to Flynn Road (most of *Wild-Premier* section)
    - **N. Branch Wiscoy Creek (*Wild-Quality*)** from mouth to Rt 362 (entire *Wild-Quality* section)
  - Streams to be included for supplemental angler use estimates only
    - **Clear Creek (Arcade) (*Wild-Premier*)** from mouth to Rt 98 (entire *Wild-Premier* section)
    - **Elton Creek (*Wild-Quality*)** from Rt 16 to former Swanson Hill Road (entire *Wild-Quality* section)
    - **Lime Lake Outlet (*Wild-Premier*)** from mouth to Lime Lake (entire *Wild-Premier* section)
    - **Trout Brook (*Wild-Quality*)** from mouth to Hillside Road (entire *Wild-Quality* section)
- Estimate of time required to complete a count run:
  - Entire count run should take no more than 2 hours
  - Return drive to start point for second count will be less than ½ hour.
- Count Methods: Count vehicles unless anglers are seen where a vehicle cannot be tied to that angler in which case the angler will be counted.
- YOY Survey Sites: 4 sites as follows (see map).
  - Wiscoy Creek (downstream of Hillside Road)
  - Wiscoy Creek (At “grey cabin” about 1 stream mile downstream of Rt 19 in Pike)
  - N. Branch Wiscoy Creek (in 2011 LUNKER project section above lower ford)
  - N. Branch Wiscoy Creek (below RR bridge in Village of Bliss)

Wiscoy Creek, N. Branch Wiscoy Creek, and Trout Brook



July 12, 2021

◉ Young of Year Sampling Site

1:144,448

0 0.75 1.5 3 mi

0 1.5 3 6 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

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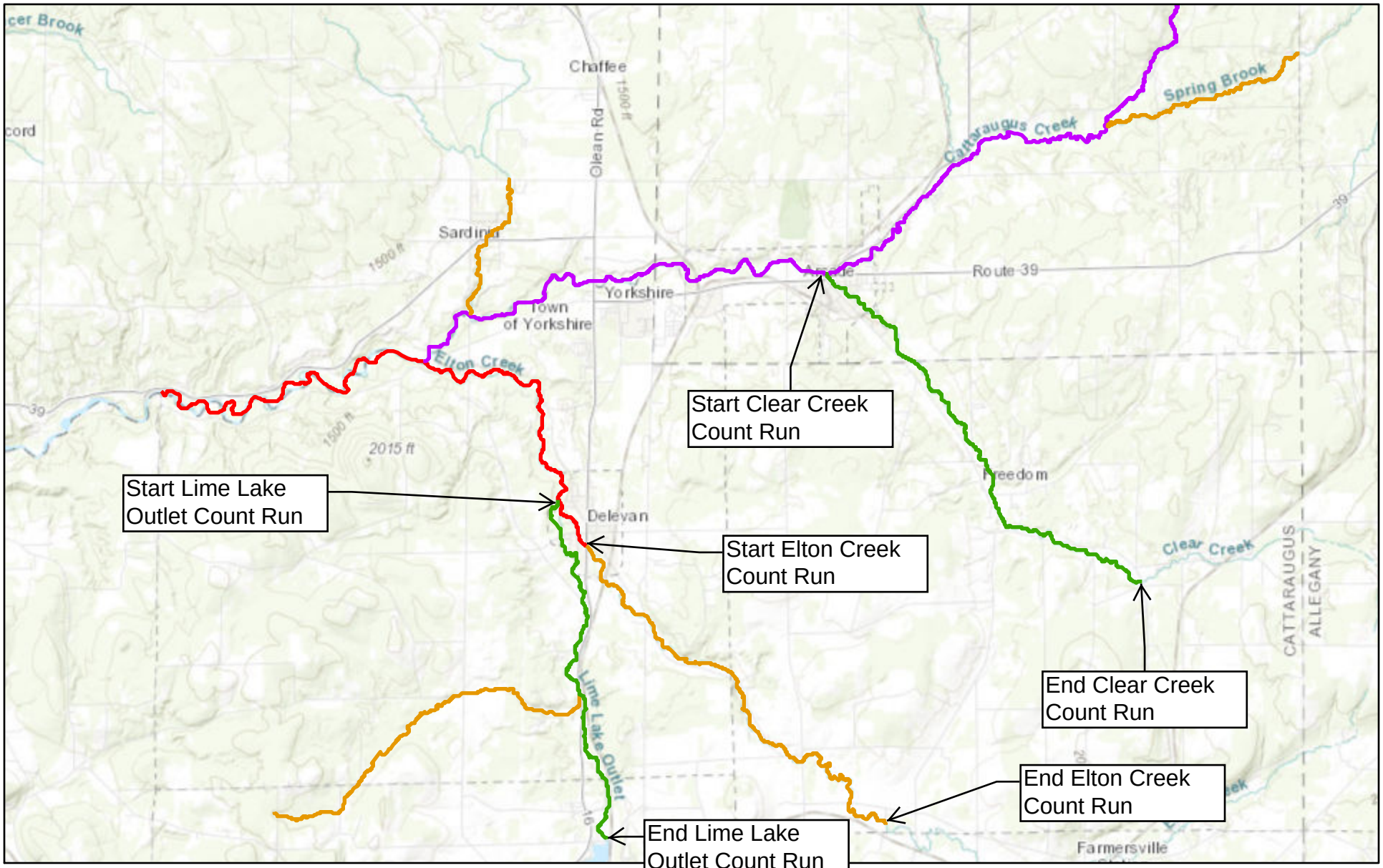
Not a legal document

Clear Creek, Elton Creek, and Lime Lake Outlet



July 12, 2021

1:144,448

0 0.75 1.5 3 mi

0 1.5 3 6 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri

Author: Craig Rockwell

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Appendix Two: 2021 Creel Schedule

Sampling Dates:

Eighteen count dates were randomly selected from the period starting October 16 and concluding December 15th (Table 1). The pool of dates was stratified by weekends (Saturdays and Sundays starting October 16) and weekdays (Monday through Friday starting October 18). One weekday and one weekend day were randomly selected for each week of the survey. For each sampling day, a direction of travel was randomly selected. Each region should randomly select which direction is represented by A and B.

Table 1 Schedule of Dates for 2021 Angler Counts

Day of Week	Sampling Date	Travel Direction
Sunday	October 17	B
Tuesday	October 19	A
Saturday	October 23	A
Thursday	October 28	A
Saturday	October 30	A
Wednesday	November 3	A
Saturday	November 6	A
Monday	November 8	A
Saturday	November 13	B
Tuesday	November 16	A
Sunday	November 21	A
Wednesday	November 24	B
Saturday	November 27	B
Thursday	December 2	B
Saturday	December 4	B
Monday	December 6	A
Sunday	December 12	B
Monday	December 13	B

Instructions for selecting count start times:

Angler counts will be conducted between 9:00 AM and sunset. For standardized scheduling sunset will be defined as 6:00 PM from October 16 through November 6 for an angling daylength of 9 hours. From November 7 (when standard time resumes) through December 15 sunset will be defined as 4:30 PM for an angling daylength of 7.5 hours.

Where the time required to complete a count run route is short enough that more than two count runs can be completed within the angling day, the angling day will be divided into time blocks equal to the time required to

complete the entire count run route. Two blocks will then be chosen at random for the first count day, two blocks will then be chosen at random from the pool of blocks remaining for the second count day et cetera until the pool of available blocks is exhausted. At this point, all blocks are returned to the pool and the same random selection process is repeated until count run start times have been selected for all count days.

As an example, the time to complete an angler count of the Swan River in Region One is approximately 45 minutes. Therefore, the count day is divided into 12 blocks under daylight savings time and 10 blocks under standard time with starting times as follows: 9:00, 9:45, 10:30, 11:15, 12:00, 12:45, 1:30, 2:15, 3:00, 3:45, 4:30 and 5:15. By randomly selecting blocks (without replacement) the count run start times are added to the schedule as follows (Table 2).

Table 2 Swan River Creel Schedule with start times for count runs

Day of Week	Sampling Date	Travel Direction	Start Time #1	Start Time #2
Sunday	October 17	B	10:30	12:00
Tuesday	October 19	A	9:45	4:30
Saturday	October 23	A	11:15	3:00
Thursday	October 28	A	9:00	1:30
Saturday	October 30	A	2:15	3:45
Wednesday	November 3	A	12:45	5:15
Saturday	November 6	A	11:15	3:00
Monday	November 8	A	12:00	3:45
Saturday	November 13	B	12:45	1:30
Tuesday	November 16	A	9:45	2:15
Sunday	November 21	A	9:00	10:30
Wednesday	November 24	B	12:45	1:30
Saturday	November 27	B	9:45	2:15
Thursday	December 2	B	12:00	3;00
Saturday	December 4	B	10:30	3:45
Monday	December 6	A	9:00	11:15
Sunday	December 12	B	1:30	3:00
Monday	December 13	B	10:30	12:00

Sample Data Form

Date: _____ **Stream Flow:** low mod high **Turbidity:** clear mod turbid

Count #1 Direction: A / B Air Temperature (F): _____ Weather: _____

Count #2 Direction: A / B Air Temperature (F): _____ Weather: _____

Reach 1	Count #1	Count #2
Site 1 Anglers		
Site 2 Anglers		
Site 3 Anglers		
Site 4 Anglers		
sum		
Reach 2		
Site 1 Cars		
Site 2 Cars		
Site 3 Cars		
sum		
Reach 3		
Site 1 Anglers		
Site 2 Anglers		
Site 3 Anglers		
Site 4 Anglers		
Site 5 Anglers		
sum		
Time Start		
Time Finish		

Comments: