TREATY FISHERIES SURVEY SAMPLING GUIDELINES – 2011

All fisheries surveys conducted on lakes that are part of the Treaty Fisheries Assessment Program will follow these guidelines. We recommend that these guidelines be followed by all WDNR fisheries biologists when conducting comprehensive fisheries surveys in ceded territory lakes.

The Treaty Fisheries Assessment Team (TFAT) conducts fisheries surveys to meet the following **objectives**:

- to estimate the abundance of adult walleyes and other selected gamefish,
- to index the fall abundance of YOY and yearling walleye and muskellunge, and other gamefish.

The first objective is met by conducting mark/recapture surveys during, and shortly after, peak gamefish spawning activity. Gamefish are captured predominately with fyke nets during the marking phase. Marking gamefish of some species is accomplished with a combination of sampling gears. Recapture sampling is done via electrofishing with a boomshocker, except for muskellunge which are recaptured one year later in fyke nets. The second objective is met by estimating CPUE of YOY and yearling walleye, muskellunge, and other gamefish in fall electrofishing surveys.

In a typical Treaty Fisheries Assessment survey the sampling sequence would progress approximately as shown in Table 1.

Table 1. Timing and temperature ranges for Treaty fisheries surveys

Survey Component	Timing	Approx. Water Temp
Spring Netting #1 (walleye/gamefish marking)	Ice-out to peak walleye spawning	40-50 ºF
Spring Electrofishing #1 (walleye recap)	Near peak of walleye spawning	45-50 ºF
Spring Netting #2 (musky marking)	Near peak of muskellunge spawning	50-55 ºF
Spring Electrofishing #2 (centrarchid CPE)	Prior to bass spawning	55-65 ºF
Fall Electrofishing (juvenile assessments)	Early fall, water temp < 65 º F	55-65 ºF

Note: Spring warming trends are highly variable. The ranges given above are best approximations.

OPTIONAL ELEMENTS

Additional Data – The guidelines that follow are minimum standards for data collection on lakes in the Treaty Assessment sampling rotation. They also closely follow the current lake sampling guidance for the statewide monitoring program. Some biologists may wish to collect additional data on fish captured during the standard survey elements listed above, for example on panfish or non-game species. Survey crews should be willing to collect additional species or data if requested. **It is the responsibility of the fisheries biologist requesting added data collection to inform the survey crew and supply them with supplemental guidance**.

SURVEY METHODS

I. Spring Netting #1 (*SN1*) – Walleye/gamefish marking

A. Purpose:

The primary objective for this sampling element is to capture and mark adult walleyes for use in estimating their abundance. The secondary objective is to mark other gamefish captured incidental to walleye netting. Other targeted sampling of those species may be conducted later in the survey to complete the marking needed to estimate their abundance.

B. Forms:

Gamefish CPE data – **Form 3600-186-CPE/N**
Walleye length, sex and clip data (tallies) – **Form 3600-186-W/N**
Gamefish length, sex and clip data (tallies) – **Form 3600-186-G/N/A1**
Gamefish length, sex and clip data (individual) – **Form 3600-186-G/N/B**
Gamefish scale data – **Form 3600-186-SCALE/G or Form 3600-186-SCALE/M**
Note: Please record **all** appropriate data in the header when filling out a data form.

C. Procedure:

1. General Guidelines

- **Gear** - Set fyke nets at ice-out and run them through the peak of walleye spawning. Water temperature will be approximately 45 ºF. Set enough nets to sample most of the walleye-spawning habitat on the lake you are surveying. Remove all nets from the lake prior to the first recapture run.

- **Recording Net Location** - Record net locations on a map of the lake being surveyed. Number all sets and note the dates when nets are moved or added. When a net is moved, a letter should be added to its net number. **Example:** When net 10 is moved to a new location, it should be noted as net 10A. Use a letter code to designate the species a net was set for. Code walleye net sets as "W". Code muskellunge nets with an "M". Code northern pike nets with an "N". And code bass nets with LB for largemouth bass and SB for smallmouth bass. **Example:** If net 10 was originally set for northern pike in a shallow bay, its net number would be 10N. If that net were moved to a gravel point to capture walleyes, its net number would be coded 10AW.

- **Number of Gamefish to Mark** - The objective for marking adult gamefish is to mark approximately 10% of the estimated population. Where no preliminary estimate is available, mark one walleye per acre, or one muskellunge per 10 acres. Netting should continue until that objective is met or exceeded. Marking more than the objective number of gamefish may improve the accuracy and precision of the resulting population estimate. However, it is probably unwise to spend more than one week netting and marking gamefish if the R/C ratio of your catches is 10% or greater.

- **Marking Gamefish** - When marking gamefish with a fin clip (i.e., HRV), make sure that enough of the fin is removed to leave a mark that will be recognizable for an appropriate time interval (i.e., 10 months on lake where creel surveys are planned). Removing at least ½ of a fin will leave a mark that lasts for more than one year. Mark adult gamefish with a primary clip. Mark juvenile gamefish with a secondary fin clip. The secondary mark will be a top caudal (TC) fin clip unless otherwise specified. Release marked gamefish away from nets and inlets or outlets, preferably at a mid-lake location.

- **Gamefish Marked in Previous Years** - Some gamefish captured during netting may carry marks from previous WDNR and GLIFWC surveys. A list of fin clips and/or tags used during past surveys will be provided each year for lakes being surveyed by the TFAT. Process gamefish with marks from previous surveys as you would any unmarked gamefish unless you receive specific direction to do otherwise. Mark them with the appropriate current-year fin clip and record them in the normal (unmarked) column on the data sheet.

- **Special Considerations on Lake Chains** - When surveying a lake in a chain, you may capture gamefish with current-year clips from another lake in the chain. Please record data from gamefish with current-year clips from other lakes in a manner that clearly separates them from data from the lake you are surveying (on a separate form or area of the form). Do not mark gamefish with current-year clips from other lakes with another clip.

2. Daily Field Methods

- **Fish CPE Data** – Count and record on a gamefish CPE data form the number of **all fish species** caught in each net each day. Record the total catch for all nets in the far right-hand column of the data sheet.

- **Measuring and Marking Gamefish - Sex, measure for total length, and mark with either a primary or secondary fin clip, all walleyes, northern pike, muskellunge, and bass captured during fyke netting. Length measurements should be in tenths of an inch. Record lengths by half-inch groups, along with sex and finclip information, on the appropriate length-frequency data sheet, and record by individual length on scale envelopes if aging material is collected.**

  For those gamefish species being marked, mark **all** sexable fish and unknown-sex fish ≥ the applicable size cutoff (Table 2) with the primary fin clip for that lake. Mark unknown-sex gamefish < the applicable size cutoff with a secondary fin clip (TC unless other specified).

Table 2. Size cutoffs for primary versus secondary clips on unknown-sex gamefish.

	Primary	Secondary	Tertiary
• Walleye	≥ 15"	≥ 7" < 15" **(TC Clip)**	
• Northern	≥ 12"	< 12" **(TC Clip)**	
• Bass	≥ 8"	< 8" **(TC Clip)**	
• Musky *****	≥ 30"	Mature fish < 30"	Immature fish < 30" **(TC Clip)**

Additional instructions for musky marking: The tertiary clip (TC) is only to be used as a short-term mark to indicate whether we have handled a fish already during the current spring sampling period. Do not record this mark, and do not record it as a recap each time you catch the same fish. If you catch a musky with a TC clip, you can release it immediately. On chains and trend lakes there will not be enough available fins to use this protocol. In these cases, use only the primary clip on fish 30 inches and larger, and a temporary TC clip on all fish less than 30 inches.

- **Taking Aging Material**

Collection of aging material on walleyes and muskellunge is the minimum requirement. Other species are optional as requested by the local biologist.

Walleye: The primary objectives in walleye aging will be to determine length breaks between ages 0-1 and ages 1-2, and to provide year class and growth rate information that may be useful in evaluating stocking programs and various length limits that are in place or under consideration. Age data from large, old walleyes are of limited value for these purposes, and should be used with caution for any purpose, given the inherent inaccuracies in the methods used here. The use of either scales or spines from large fish often underestimates age, leading to erroneous conclusions from analyses. Accurate age determination can be problematic using either scales or dorsal spines from fish older than ages 5-6.

Take scales on walleyes < 12 inches and spines from walleyes 12 inches and larger, five per half-inch group per sex plus unknown-sex fish. Use discretion in aging large, old fish which may lead to erroneous interpretation of results. Scales should be taken from below the lateral line and just beyond the tip of the pectoral fin. When spines are used, take the 2nd or 3rd complete spine from leading edge of dorsal fin. Tally sampled walleyes on a gamefish scale data sheet.

Muskellunge: Take scales from sexable muskellunge, five per half-inch group per sex plus unknowns. Scales should be taken from the nape of the fish's neck at the point where the scales are largest. Tally sampled muskies on a gamefish scale data sheet.

Northern Pike (optional): Take scales from sexable pike, five per half-inch group per sex. Scales should be taken from the nape of the fish's neck at the point where the scales are largest. Tally sampled pike on a gamefish scale data sheet.

Largemouth and Smallmouth Bass (optional): Take scales from five bass per half-inch group. Scales should be taken from below the lateral line and just beyond the tip of the pectoral fin. Tally sampled bass on a gamefish scale data sheet.

II. Spring Electrofishing - General protocol for all electrofishing runs

A. Purpose:

The objectives of this sampling element are to recapture gamefish marked in previous sampling, or to continue marking additional gamefish, for use in calculating population estimates; and to mark gamefish for use in later angling exploitation estimates.

B. Forms:

Walleye length, sex and clip data (tallies) – **Form 3600-190-W/E1**

Gamefish length, sex and clip data (tallies) – **Form 3600-190-G/E/A1**
Gamefish length, sex and clip data (individual) – **Form 3600-190-G/E/B**
Gamefish scale data – **Form 3600-186-SCALE/G or Form 3600-186-SCALE/M**
Panfish/Nongame/Gamefish (individual) – **Form 3600-190-PNG/E/A**
Panfish/Nongame/Gamefish (tallies) – **Form 3600-190-PNG/E/B**
Note: Please record **all** appropriate data in the header when filling out a data form.

C. Procedure:

1. General Guidelines

- **Gear** – Use a "three-person" boomshocker to shock the entire shoreline, including islands, of each lake surveyed.
- **Recording Sampling Route** - Mark a map of the lake with the route(s) followed by the crew(s) for each electrofishing run.
- **Marking Gamefish** – Follow the guidance outlined in the walleye netting section (**I.C.1.**) for species and number of gamefish to mark, marking procedure, handling of previous-year fin clips and special considerations for lake chains.

2. Daily Field Methods

- **Measuring and Marking Gamefish** - Sex, measure for total length and examine for marks those gamefish species indicated in the specific instructions below for each electrofishing run. Mark any new (unmarked) gamefish captured with the appropriate current-year fin clips (note size cutoffs in Table 2 above) unless otherwise specified in run-specific guidance. Record length, sex and fin clip data on an appropriate data sheet.
- **Taking Aging Material** – Collect scales or spines according to the species-specific procedures outlined in the walleye netting section (**I.C.2.**). Collect aging material only from gamefish in size ranges needed to complete the collection of 5 samples per ½-inch group for the sampling season. Review the gamefish scale data sheet for the lake you are sampling.

III. Spring Electrofishing #1 (*SE1*) – Adult walleye recap run

A. Purpose:

Data from this recapture run will be used to estimate the adult walleye population, and to continue marking additional walleyes (for exploitation estimates) and muskellunge (if a musky population estimate is planned). **Other species are optional as requested by the local biologist.**

B. Forms:

Use the forms listed in the general protocol for electrofishing runs (**II.B.**).

C. Procedure:

1. General Guidelines:

Conduct this shocking run near the peak of walleye spawning. Water temperature will generally be between 45 and 50 ºF. Remove all fyke nets from the lake at least one day prior to this run. Consult the general protocol for electrofishing runs for other procedures (**II.C.1.**).

2. Daily Field Methods:

Collect and process all walleyes and muskellunge. Follow the general protocol for electrofishing runs for measuring, marking and taking aging materials from gamefish (**II.C.2.**). ***Continue marking new (unmarked) walleyes and muskellunge (and other species if requested).***

IV. Spring Netting #2 (SN2) – Musky marking (Skip this section if no muskellunge PE is planned)

A. Purpose:

The primary objective of the TFAT for this sampling is to capture and mark adult muskellunge for use in estimating their abundance. Other species are optional as requested by the local biologist.

B. Forms:

Use the forms listed in the walleye netting section (**I.B.**).

C. Procedure:

- **Gear** - Set fyke nets after the first gamefish recapture run through the peak of muskellunge spawning. Water temperature will be approximately 55 ºF. Set enough nets to sample most of the muskellunge-spawning habitat in the lake you are surveying.
- **Other** – Follow the general guidelines and daily field methods outlined in the walleye netting section (**I.C.1 & 2.**). ***Mark only new (unmarked) muskellunge and (and other species if requested).***

V. Spring Electrofishing #2 (*SE2*) – Centrarchid CPE

A. Purpose:

The primary focus of this run will be to collect adult largemouth and smallmouth bass and panfish for size structure and CPUE data. ***This sampling element will be added to selected lakes in the Treaty Lake Rotation.***

B. Forms:

Use the forms listed in the general protocol for electrofishing runs (**II.B.**).

C. Procedure:

1. General Guidelines:

Conduct this sampling approximately 2-4 weeks after the walleye recapture run (at water temperatures between 55º and 65º F). Consult the general protocol for electrofishing runs for other procedures (**II.C.1.**).

2. Daily Field Methods:

- The entire shoreline should be divided into 2-mile segments. Within each 2-mile segment, all bass and muskellunge (if a PE is planned) will be collected in a 1½-mile **Gamefish station.** Also, all bass, muskellunge (if a PE is planned), and panfish will be collected and "catchable" carp will be counted (if present) in a ½-mile **Panfish station**. The minimum coverage needed is as follows:

Total Lake Shoreline (miles)	Minimum Sampling Required (2-mile segments)
< 6 miles	Entire shoreline/2 panfish stations
6 to 12 miles	3 gamefish stations/3 panfish stations
12 to 24 miles	4 gamefish stations/4 panfish stations
> 24 miles	5 gamefish stations/5 panfish stations

- The first 2-mile segment should be chosen randomly and the other 2-mile segments should be equally spaced around the lake to achieve uniform coverage.

- Actual distance sampled will be recorded and may be determined by GPS or by shoreline landmarks; mark the sampled segments on a lake map. Also, be sure to record time sampled.

- Within each 1½-mile Gamefish station, all bass and muskellunge (if a PE is planned) will be collected, counted and measured to the nearest 0.1 of an inch. Record the data from each 1½-mile gamefish station and each ½-mile panfish stations separately.

- Within each ½-mile Panfish station all bass, muskellunge (if a PE is planned), and panfish, are collected. All gamefish will be measured, and a minimum of 100 individuals of each panfish species will be randomly selected (dipped from tub) and measured. Also record the number of "catchable" carp you saw (if present). Data from each ½-mile Panfish station (including any gamefish species collected) should be recorded separately and should not be combined with data from the larger 1½-mile Gamefish station.

- ***Mark only new (unmarked) muskellunge (if a PE is planned) unless specifically directed.*** Follow the general protocol for electrofishing runs for measuring and taking aging materials from gamefish (**II.C.2.**).

VI. Fall electrofishing – Juvenile assessments

A. Purpose:

The primary focus of this run is to determine CPUE for young-of-year (YOY) and yearling walleyes, and CPUE of other YOY gamefish.

B. Forms:

(PLEASE RECORD ALL DATA ON TALLY FORMS, NOT INDIVIDUAL LENGTHS)

- **Fall Walleye Electrofishing Data Collection Sheet (3600-190-W/E/FALL).** Use to record walleyes of all sizes. Walleye lengths are to be recorded by one-tenth-inch groups up to 13.4 inches and by half-inch groups from 13.5 to 29.9 inches.
- **Fall Gamefish Electrofishing Data Collection Sheet (3600-190-G/E/FALL**). Use to record gamefish, other than walleye, by half-inch up to 50 inches.

C. Procedure

- **First priority is to dip YOY and 1+ walleye**. These fish should be measured and recorded on the walleye fall electrofishing form (**3600-190-W/E/FALL)**. **Scales should be collected from 5 fish per ½-inch group from 7-12 inches, to enable identifying year class breaks between YOY and 1+, and the top end of the1+ fish.**
- Next highest priority is to **dip all other YOY gamefish**. These fish should be measured and recorded on a gamefish fall electrofishing form (**3600-190-G/E/FALL)**. You're not required to take scales from these fish.
- Collecting of species and or size/age classes other than those mentioned above is optional, but lower in dipping priority. .
- Comment on the presence and relative abundance (# of individuals) of other fish species present (Present ≤100, Common = 100-1,000, or Abundant ≥1,000). Note this on the gamefish fall electrofishing form.
- On a lake map, be sure to record: survey date, crew members, starting and ending points, and mark the actual shoreline/path shocked by each boat.